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The Horizon of 1949

IN testimony before the Flanders Committee regarding profits, Prof. Seymour E. Harris of Harvard said they were too high. Prof. Sumner H. Slichter, also of Harvard, said they were too low. On the subject of business, Prof. Slichter has written a book which proves that business is not heading into a recession. Another colleague, Prof. Joseph L. Snider, in the latest issue of the Harvard Business Review, takes issue with this forecast and believes that business is on the skids.

We do not mean to disparage the erudition or sincerity of these scholars. They all present formidable arrays of statistics and reach their diverse conclusions by apparently solid processes of logic. A fair conclusion is that the subject matter under discussion is far from scientific. There is ample room for an honest difference of opinion. This is particularly true of business forecasts.

Unfortunately, the businessman cannot operate with academic detachment. He must make advance commitments involving the welfare of his business and he wants to know whether the barometer says up or down. With this need in mind, we pass on the private consensus of a number of professionals who help in the formulation of responsible business policy.

The coming year will not be as good as 1948. Department store sales have fallen behind the previous year for six weeks in succession. Freight traffic is off about 4%, passenger traffic 10%. For the first time since prewar days, coal is piling up. Oil products are crowding capacity. Jewelry, liquor, clothing, washing machines, lumber, radios, Florida reservations, even milk and bread, are down. To be sure, this is all history. Statistics merely show where we have been.

Yet the business prophets, i.e., most of the good ones, say there is more of this ahead. In fact, if it were not for ECA, domestic rearmament, and a residue of deferred capital needs stemming from the subnormal decade of the thirties and the war, the country might be facing a drastic readjustment. Happily, students of the business cycle point to this anomaly. In all previous downward moves the procession has been led by heavy industry. Pig iron production, scrap prices, steel operations—these have been the significant indicators which in the past have warned of stormy weather ahead.

On the present occasion it is precisely these fields of industry which are standing up. Steel continues under pressure. There is no sign of weakness in scrap prices. The demand for structural and light steel continues strong. Freight cars, automobiles, and an important area of nonferrous products, heavy electrical equipment, total construction—all continue as robust props of the business future. A major recession with these fields active, at or near capacity, would be an economic paradox.

It is for this reason that the majority of business students, while admitting the presence of, indeed the need for, an adjustment, believe that it will be modest. To be specific, business in 1949, barring war, in terms of physical volume may be down 10% for the year, certainly not more than 20%. This will mean vigorous competition, a drop from capacity operations, price declines in spite of higher labor costs, and a fall in profits far greater than the decline in physical volume. The golden forties are coming to an end. Booms cannot last forever. Fortunately, most businessmen have been forewarned and are prepared.

Joseph Stagg Lawrence

► The lowest competitive bid received this year to build a blast furnace at U. S. Steel's Edgar Thomson Works was 110 pct greater than it actually cost to build an identical furnace in 1941. The increase for a blooming mill at Geneva over a similar mill's 1943 cost at Homestead is 167 pct. Cost of coke oven capacity per ton on the basis of actual experience is 173 pct greater than it was in 1939.

► One American foundry which specializes in casting stainless steels claims to have developed independently a successful process for centrifugal casting of high temperature stainless steels in permanent molds. Circular engine components such as rings and sleeves for the Pratt & Whitney J-42 turbo jet engines have already been manufactured by this process on a production basis. First shipments by the company were made in December 1947.

► On the basis of initial government forecasts for 1949 construction, steel needs for building activity may well exceed 8 million tons. Regardless of any public housing legislation, government funds will finance construction of 30,000 dwelling units, or double the 1948 figure. Some of these will be prefabs.

► The General Motors new car showing at the Waldorf Astoria from Jan. 20 to 27 is expected to outdo any previous showing by a single producer. The GM "train of tomorrow" will bring press and radio representatives from Detroit to New York on Jan. 17. In addition to the new 1949 GM cars, dramatized presentations of GM styling, engineering and research aspects of the new cars will be featured.

► How far has the gray market slipped? In Chicago last week sellers were offering standard hot rolled waster sheets 15 to 40 in. wide, 20 to 90 in. long and 18 to 22 gage at 8½¢ to 10¢ per lb. Best offers to buy were at 6¢. Last summer this material was bringing from 12¢ to 14¢ depending on how desperate the buyer was. Present mill base price runs 2.7¢ per lb for 6 gage up to 3.7¢ for 28 gage.

► A considerable amount of mill switching, both at the suggestion of the steel buyer and the steel seller, has been going on. In some instances the resulting freight savings have been substantial. This is one aspect of f.o.b. selling that may earn customer approval after the possibilities have been fully explored.

► Parts of an automotive valve assembly are being machined at exceptional daily production rates by means of an automatic device built into the machine cycle. Parts are brought to the machine in trays, picked up, loaded, chucked, machined, unchucked, unloaded and removed from the machine to another tray for movement without any aid from the operator.

► Regardless of final appropriations by Congress for the armed services, steel requirements of the military establishment are now expected to amount to about 1.8 million tons next year and an estimated $15 billion cost. Any increase or decrease in the cost will probably mean only a shifting or revamping of uses to which the amount of steel will be put.

► Steel shortages are seriously cramping expansion plans of natural gas companies. As of Sept. 1, major gas companies had only about 760,000 tons of pipe in sight for 1949. Their requirements for projects already authorized amount to 2.2 million tons. One company alone needs 80,000 tons for a single line.

► International Harvester's Louisville, Ky., works is using RF and AF induction heating exclusively for heat treating tractor components. Induction heating is also being used exclusively for heating bars and billets to forging temperatures. Presses and upsetters are used for forging. The use of induction hardening has permitted the application of carbon steels where, if other methods of heat treating were used, alloy steels would be necessary. The lack of scale on induction heated forging stock has materially increased die wear.

► Radiant heating of highways by electricity is being tested in a 500 ft section of roadway in an outlying Detroit area.

► Cost increases about which steel executives are concerned include rail freight rate boosts in addition to wage advances. It would be a miracle if 1949 did not see a continuation of railroad rate increases--there have been two a year in each of the three postwar years. Whether they come on raw materials (as industry men fear) or on finished iron and steel products, the steel consumer will have them thrown right in his lap.

Metallurgy and Heat

Reflecting the views of a tool steel consumer, this article explores the metallurgical aspects of tool steels, particularly cutting tools, and their relation to quality of end product. Problems encountered in the selection of steel for cutting tools and in the development of optimum heat treatment cycles for various types of tools are discussed, supplemented with metallographic studies. Inspection and testing and factors such as hardenability, hardness, toughness and grain size are considered, in this, the first part of a two-part article.

ALTHOUGH the art of making cutting tools is as old as civilization itself, the development of cutting tool manufacture has rendered necessary the application of many modern scientific techniques. In this respect the field of metallurgy presents many interesting problems, because not only do the tool steels themselves involve perhaps the most complicated series of physical reactions of any commercial alloy, but the nature of the parts made from these steels requires the maximum control of all metallurgical details. In addition, the application of metallurgical principles to the selection of steel as well as to tool design has often resulted in the production of a superior and more economical tool. In this article an attempt will be made to discuss some problems encountered in the selection of steel for cutting tools and in the development of the optimum heat treatment of each tool.

There are four criteria which determine the cutting qualities of any tool; (1) suitable raw material; (2) proper design; (3) careful tool making, and (4) correct heat treatment. Each of these conditions must be satisfied before maximum tool performance is secured.

In common with most manufactured articles, labor costs greatly exceed the raw material costs of a cutting tool. It is because of this fact that the quality of the raw material, in this case tool steel, must be rigidly controlled so that inherent defects in the steel may not suddenly make their appearance to cause the loss of a finished tool. Not only is it important to examine the steel for internal and external defects, but also for its response to hardening and tempering.

It is fortunate in this regard that three simple metallurgical tests, coupled with mill reports on analysis, are able to give a clear picture of tool steel quality to an experienced observer. These tests are: (1) visual examination of hardened and fractured bars; (2) file or Rockwell tests on hardened and tempered bars; and (3) microscopic examination of the annealed bar. Of these tests, Nos. 1 and 2 are generally the only ones required; test 3 acts as a check on test 1.

Since inherent defects in tool steels are due to melting, rolling and forging, or annealing practice, in consideration of the method of manufacture of tool steel, it is not necessary that each bar be tested before use. This particularly applies to the smaller sizes; hence under a certain size, percentage inspection is adequate. On the larger sizes, however, at least one and generally both ends of each bar are tested, using one or all three of the methods mentioned. Such a comprehensive inspection is both timeconsuming and expensive but has resulted in a more uniform and better quality product both for production and performance in the field.

Inspection includes examination for defects and for response to the hardening operation. With modern steels produced by careful steelmakers, gross defects such as seams, center bursts and porosity are not common. Of most concern, therefore, is the response to hardening and tempering. For carbon steels the P-F test, which may be supplied by the mill, is useful in determining the inherent hardenability and fracture grain size of each heat. Actual conditions pertaining to each shipment are quickly determined by fracturing hardened disks from all or representative bars. These fracture tests also enable decarburization to be checked by the file test. A set of Shepherd standard fracture grain sizes is essential in developing the fracture test technique.

For high-speed steels, the fracture test not

Treatment of Cutting Tools

By P. LECKIE-EWING

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only reveals the grain size, but also such defects as carbide streaks and laminations, or dirt streaks, which are common to this grade when melting conditions have not been kept under strict control.

With regard to the hardenability of high-speed steel, strict control of analysis is essential for uniform response to a standard hardening tempering cycle such as is required in production work. Second in importance to analysis, is annealed microstructure. A microstructure containing masses of heavy carbide with a few "pin-point" carbides will not harden, after tempering to 64 to 65 RC unless considerably overheated (and thereby coarsened), even if the analysis shows adequate alloy and carbon content (see figs. 1 and 2). Generally, tool steel mills take special care to see that a heavy carbide type of microstructure is not developed in their processing practice.

Owing to the inherently brittle nature of high-speed steel, it is important that all factors contributing to the toughness of the grade should be carefully controlled. Apart from hardening practice, which will be discussed later, the most important factors in this regard are inherent grain size and annealed microstructure. The term inherent grain size has largely been applied to carbon steels but with reservations can also be legitimately applied to high-speed steel.

The most common method of measuring grain size is by the "Snyder-Graff" or intercept method.* Owing to the effect of hardening temperatures on grain size, it is essential that the high heat temperature be closely controlled. In this respect, the electric salt bath is a convenient heating medium. Returning to grain size, however, it has been found that once the hardening temperature is known and controlled, measurements of intercept grain size are quite reproducible. It should be pointed out that carbide size and distribution is the governing factor in the development of a coarse or fine grain when hardening is as described, figs. 1 through 4. This means that there may be some variation, depending on the

** In this test, an image of the hardened (not tempered) and etched specimen is projected on a screen at 1000X, and the grains crossed by a line 5 in. long scribed on the screen, are counted. The average of ten counts is taken as the grain size.*

FIG. 1—Structure of an 18-4-1 high-speed steel (sample No. 1) in the center regions of a 6-in. round bar. Salt hardened at 2300°F, not tempered. Etched in 5 pct Nital for 4 min. Micro shows heavy eutectic carbides and coarse austenite grains; few fine carbides are visible. Intercept grain size 6.3. 500X.

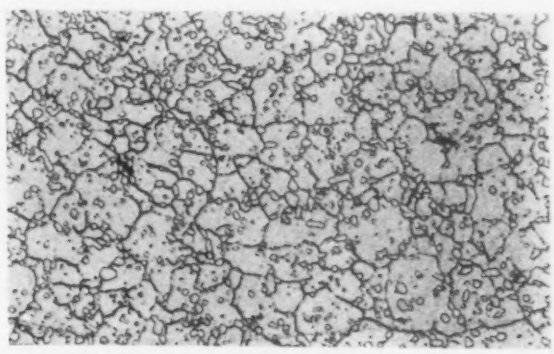


FIG. 2—Structure of an 18-4-1 high-speed steel (sample No. 2) in the center of a 1-in. round bar. Salt hardened at 2300°F, not tempered. Etched in 5 pct Nital for 4 min. Micro shows many fine carbides uniformly distributed and fine austenite grains. Intercept grain size 16.7. 500X.

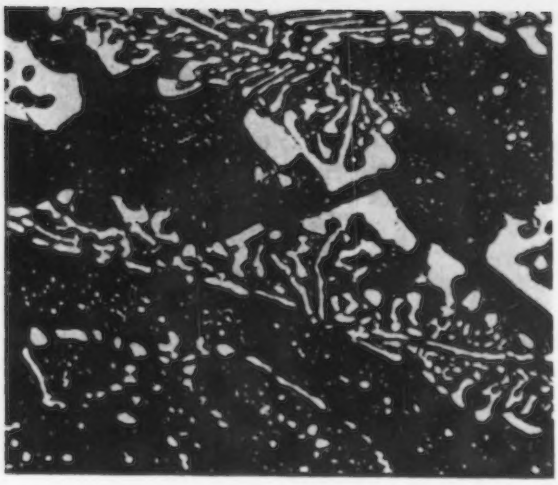
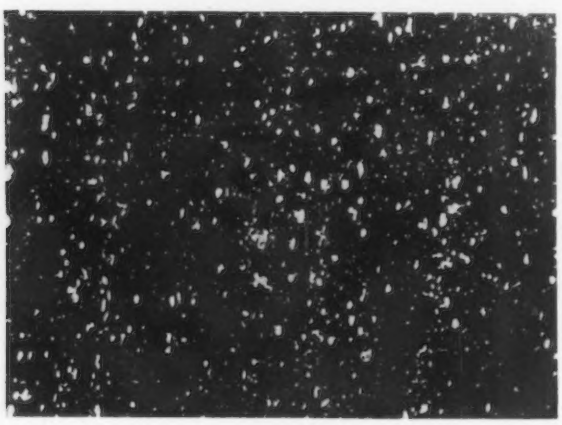


FIG. 3—Structure of an 18-4-1 high-speed steel (sample No. 1) in the center regions of a 6-in. round bar. Heat treatment same as in fig. 1 but tempered at 1050°F for 2+2 hr. Etched in 2 pct Nital for 1 min. Micro shows many coarse eutectic type carbides; few fine carbides are visible. Hardness 62.5 Rc. 500X.

size of the bar, between different bars of the same heat.

It is here that an objection to the term "inherent grain size" might be made in that the grain size is not necessarily constant for any one heat. However, when this factor is realized, measurements of intercept grain size are extremely useful in determining the suitability of high speed bars or sheets for specific purposes. Figs. 1 through 4 show the effects of lack of very fine or "pin-point" carbides on grain size after hardening. Both samples were salt hardened from the same temperature yet the grain size of sample No. 1 (figs. 1 and 3), which contains heavy eutectic carbides and very few small spheroidal carbides averages 6.3, while that of sample No. 2 (figs. 2 and 4) is 16.7. Sample 1 developed only 62.5 Rc after hardening and tempering twice at 1050°F; sample 2 developed 64.5 Rc under the same treatment. Figs. 3 and 4 show the same steels after tempering at 1050°F. The comparison between the large, heavy carbides in sample 1 and the fine uniformly distributed "pin-point"

FIG. 4—Structure of an 18-4-1 high-speed steel (sample No. 2) in the center of a 1-in. round bar. Heat treatment same as in fig. 2 but tempered at 1050°F for 2+2 hr. Etched in 2 pct Nital for 1 min. Micro shows many fine pin-point type carbides. Hardness 64.5 Rc. 500X.



variety in sample 2 is made more obvious by the tempering treatment.

Equal in importance to grain size, and to a large extent controlling it, is the type of annealed microstructure. A microstructure containing any eutectic carbide, heavy carbide streaks, or a cored carbide distribution will result in an uneven response to hardening as well as a tendency to crack in heat treatment or use. A cored or eutectic type of microstructure is also, as has been mentioned, inherently coarse grained and thereby even more brittle. Figs. 5, 6 and 7 show various types of annealed microstructures of high-speed steel. Fig. 5 reveals an excellent type of structure having the carbides uniformly distributed, and small and

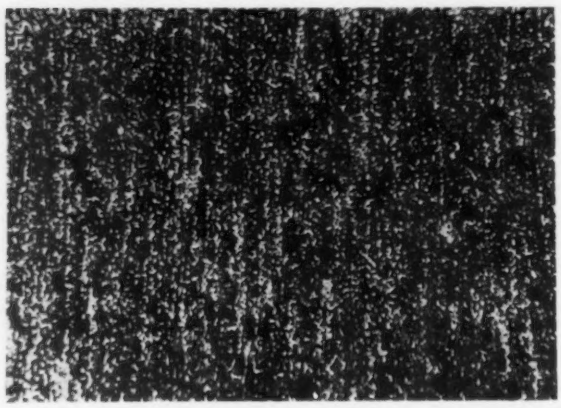


FIG. 5—Structure of an 18-4-1 high-speed steel, bar size 2½ in. round, in the annealed condition. Etched in 4 pct Nital for 20 sec. Micro shows small uniformly distributed carbides (good structure). 100X.

uniform in size, while figs. 6 and 7 show rejectable structures, that of fig. 6 being badly cored as well as containing large eutectic carbides, while fig. 7 shows hooky, heavy carbide masses.

Heat Treating Metallurgy

It should be emphasized that selection of first quality raw materials in accord with the foregoing principles must be accompanied by equally careful attention to design, toolmaking, and heat treatment before one can secure the greatest benefit from the inspection processes. In a discussion of heat treatment, therefore, it is a first consideration that the process be under strict control, based on a sound metallurgical knowledge of all the factors involved. Standardization of such control will result in not only a more economical production, but will also establish metallurgical factors, such as hardness, toughness and wearability, as inherent and reproducible qualities that can be incorporated into the design of each tool.

Before discussing details and methods of the heat treatment of cutting tools, it is of interest to mention some of the properties of tool steel which are developed by heat treatment and their effect on the performance of the finished tool.

The primary purpose of the hardening operation is to increase the hardness of the soft annealed steel. For cutting tools, this means developing a hardness of from 60 to 65 Rc, the exact hardness depending on the application and type of tool. Since the results of a Rockwell test can generally be related to the performance of the tool, it has been found a very accurate and rapid means of controlling heat treatment. Experience has shown in this regard that the optimum Rockwell range is generally $\pm \frac{1}{2}$ Rockwell C which is the limit of accuracy of the Rockwell machine itself. Such a close range makes imperative strict control of steel uniformity and of hardening and tempering conditions.

An important effect of the hardening process is the development of the property of red hardness by certain steels. Carbon and low alloy tool steels rapidly lose their hardness at temperatures above 300°F, so tools made from these steels cannot be used advantageously for production work, particularly on heavy duty operations. However, for hand tools and for tools where high-speed production is not the governing factor, carbon steels can be successfully used.

The name high-speed steel although generally taken as referring to a specific analysis, originally meant a steel which would cut at a high speed. High speed cutting produces high temperatures, thus a prerequisite of any high-speed steel is that it possess high red hardness. The familiar 18-4-1 and 6-5-4 types of tungsten and molybdenum high-speed steels retain their hardness to a much higher temperature than lower alloy tool steel, as shown in fig. 8. The addition of cobalt in amounts up to 12 pct further increases the red hardness of both grades.

For any one grade of high-speed steel, the red hardness can be markedly raised by increasing the hardening temperature. This results in increased solution of carbides which, while increasing red hardness, also increases room temperature hardness and severely decreases toughness. Thus, only on tools in which toughness is not a governing factor is the higher hardness temperature practical. Such tools as lathe and planer tools, tool bits, etc., are of this type, while milling cutters, taps, and drills require too much toughness for this treatment.

Although it is obvious, in a general way, what is meant by the term tough as applied to steel, specific measurement of this property is extremely difficult owing to the number of variables involved. It has become necessary therefore to define each toughness test with respect to the particular kind of toughness which it measures. Thus there is a bend test, a torsion-impact test, a direct impact test (Izod and Charpy), a knife-edge impact test and a static torsion test, all giving valuable information regarding the toughness of the steel, but all measuring different kinds of toughness.

Perhaps the most common tests for tool steels are the torsion impact and the static torsion tests, both of which give easily obtained, reproducible results which, in a general way, can be applied to the design of the finished tool. It should be mentioned that while toughness is a very important property of a cutting tool, it must take second place to hardness. Since it has been found that high toughness and high hardness are two diametrically opposed properties, the problem of increasing the toughness of a tool is somewhat contradictory. However, by control of the cleanliness and homogeneity of the raw material and by careful heat treatment, it is possible to secure, if not high toughness, at least toughness great enough to insure successful use of the tool.

For the carbon and the low alloy tool steels,

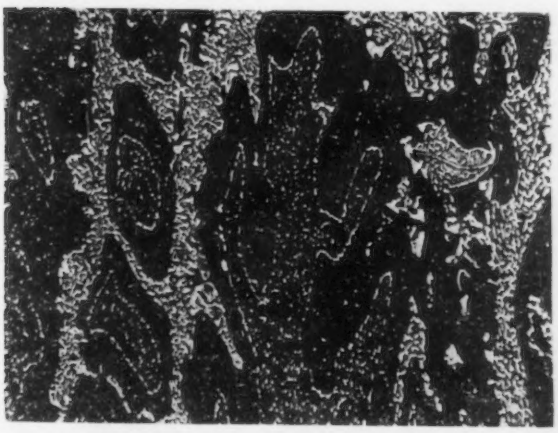


FIG. 6—Structure of an 18-4-1 high-speed steel, bar size 5 3/32 in. round, in the annealed condition. Etched in 4 pct Nital for 20 sec. Micro shows coring defect, heavy eutectic carbides and lack of fine carbides (poor structure). 100X.

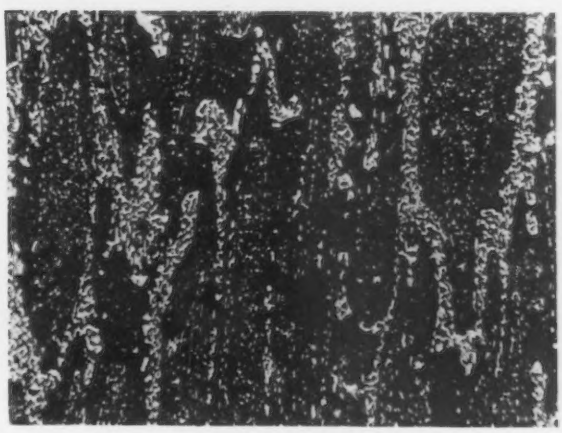


FIG. 7—Structure of an 18-4-1 high-speed steel, bar size 6¼ in. round, in the annealed condition. Etched in 4 pct Nital for 20 sec. Micro shows some coring, heavy carbides and hooky carbide stringers (poor structure). 100X.

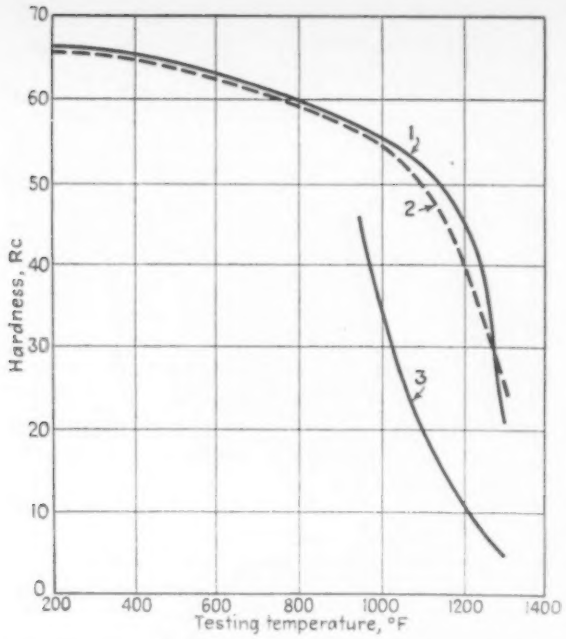


FIG. 8—Red hardness of high-speed and alloy tool steels. Curve No. 1 represents high tungsten-molybdenum high-speed steel; curve No. 2 represents 18-4-1 high-speed steel; curve No. 3 represents high carbon high chrome tool steel.

a 100 pct spheroidized microstructure free from any trace of grain boundary carbides is essential for optimum toughness of the hardened and tempered tool. The steel should also have a very low inclusion count since any nonmetallics, being elongated during rolling will develop long stringers of glass-brittle material which might eventually be present at a highly stressed region in the tool. The annealed microstructure of high-speed steel must also be controlled within narrow limits to secure maximum toughness.

Apart from nonmetallic inclusions, the most common inherent defect contributing to brittleness is poor carbide distribution. This may be shown in carbide streaks or in a cored, hooky, or eutectic type of carbide segregate. Smaller bars tend toward the streaked condition while bars over 4 in. tend to show the cored or hooky type effect (see figs. 5, 6 and 7). A typical carbide streak is shown in fig 9 at 150X. The light etching structure is due partly to the high concentration of carbides and partly to the fact that, under normal hardening and tempering, the matrix of the streak contains large quantities of retained austenite, neither of which constituents etch dark with the standard high-speed steel etch.

Microhardness traverses, taken as shown across the streaked zone in the hardened and tempered disk in fig. 9, showed a hardness of 56 Rc for the streak, compared to 64 Rc for the surrounding steel. On further repeated tempering, the hardness of the streak rose to 65 Rc while that of the disk dropped to 63. Such tempering reactions confirm the metallographic evidence of retained austenite. The deleterious effect of the large masses of brittle carbide would therefore appear to be magnified by the presence of the relatively soft high carbon austenite, as well as by the difference in hardness between the adjacent zones.

A cored, hooky or eutectic microstructure

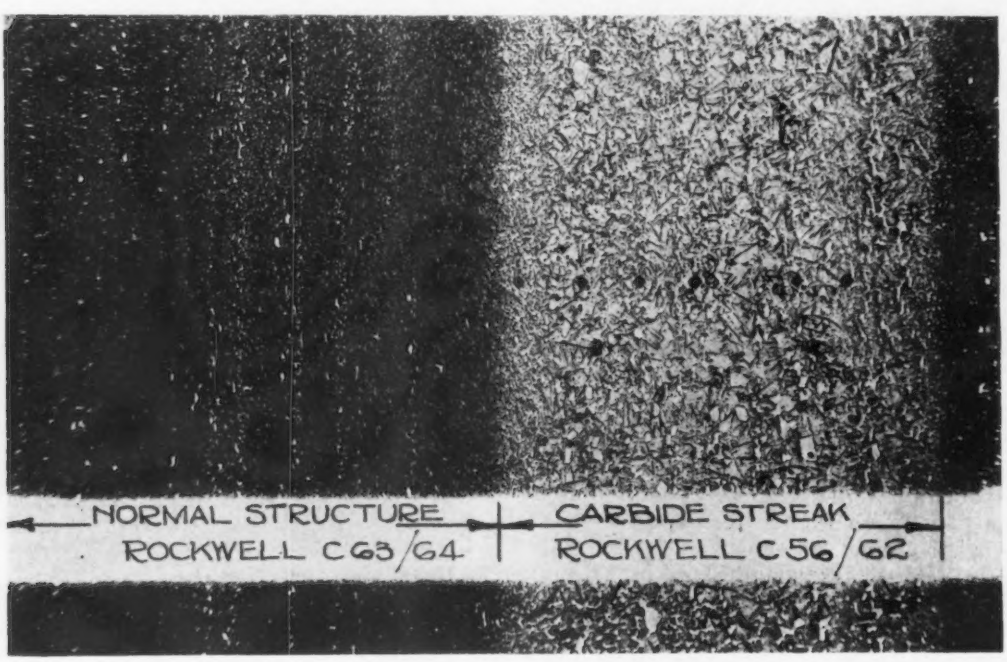


FIG. 9—Structure of an 18-4-1 high-speed steel. Heat treatment—2350°F hardening temperature, 1050°F double temper. Micro shows wide carbide streak (light etching); note microhardness impressions. Etched in 2 pct Nital for 1' min. 150X.

promotes brittleness in hardened high-speed steel because of the long stringers of coarse carbides and attendant presence of retained austenite, and the coarse grain developed in these structures. It is believed the large grain is due here to the absence of fine carbides which act to prevent grain growth in high-speed steel. Since a cored or hooky bar generally shows this defect over a large area, it is not uncommon to find regions which have an intercept grain size of 1 or less. Such steel is not satisfactory for cutting tools (see figs. 1 and 3).

In a subsequent issue, the author will describe temperature control and atmosphere control measures, including the use of salt baths. Also to be discussed are special treatments such as refrigeration, nitriding and chromium plating.—Ed.

Soldering Fluxes

IMPORTANT to the success of soldering is the choice of a flux. A flux for soldering should be fluid at soldering temperature; have a slagging action on oxides of metals and refractory substances; be a barrier to the re-oxidation of the metal surface; and be capable of being displaced from the solid metal by the solder. The Tin Research Institute, in a publication entitled *"Notes on Soldering,"* describe some of the more common fluxes for soldering and describe their characteristics.

Zinc chloride or killed spirit is a common flux, made by dissolving 6 oz of commercial fused zinc chloride in 1 pt of water. The fluxing action of zinc chloride is rapid and certain, but the fused residues together with the spray from earlier evaporation remain on the metal close to the joint and may cause corrosion unless removed. The residue is best removed by washing in hot water containing a few drops per gal of hydrochloric acid, and rinsing in hot water containing washing soda. The melting point of zinc chloride, 504°F, is higher than desirable in many soldering applications. The addition of 10 pct of ammonium chloride effectively reduces the melting point.

Ammonium chloride solution can be used alone as a flux, but it is much less effective and its corrosive after-effects are as damaging as those of zinc chloride. It is useful for tinning soldering bits, but care must be taken not to inhale the vapor.

Hydrochloric acid used at half strength when soldering zinc is more effective in cleaning than zinc chloride. A mixture of this acid and zinc chloride in equal proportions is a flux for stainless steel. The vapor should not be inhaled and the article soldered should be later washed to prevent corrosion.

A solution of orthophosphoric acid, H_3PO_4, 40 pct by volume, is an effective flux for steel, copper and brass. It leaves a glassy residue, which on steel may serve as a protective coating. Under some conditions it is corrosive.

A 25 pct solution of lactic acid is a quick-acting flux for steel, copper and brass but residues are corrosive and, as it is expensive and scarce, there is little to recommend it.

Resin, rosin or colophony is a pine tree gum that reacts mildly at close to soldering temperatures. It is sometimes applied by sprinkling the powder on the joint, but a more effective way is to brush it on as a solution. Methylated spirit, industrial spirit, methyl or ethyl alcohol can be used as a solvent, as can propyl and butyl alcohols, carbon tetrachloride, and oil of turpentine. Resin flux may be made more active by the addition of oleic or lactic acid, where the resin is 20 pct, the acid 5 pct, and the remainder methylated spirit.

Where resin is too slow or insufficiently reactive for soldering, there are additives more reactive with metallic oxides but which decompose and become non-corrosive at soldering temperatures. Typical of these substances are the hydrochlorides of organic substances, known as amines; and hydrocarbons such as tetrachloride of naphthalene.

Paste fluxes will not drain off the work and can be carried as a core in a hollow wire solder. Paste flux may be mixed with powdered solder or tin to form a solder paste that can be applied by brush to the work while it is still cold. There are a number of paste-forming ingredients, such as tallow, and lanoline with glycerine and petroleum jelly. The U. S. Army specification for a paste flux prescribes:

Petroleum Jelly	65 pct ± 10 pct
Ammonium Chloride	3.5 pct ± 1.5 pct
Zinc Chloride	25 pct ± 5 pct
Water	6.5 pct ± 3.5 pct

A new flux, developed by Dr. B. W. Gonser of Battelle Memorial Institute, in which at soldering temperature the components interact producing a neutral salt and releasing a small amount of hydrochloric acid, is described as glutamate flux. It is prepared as follows: 400 g urea are dissolved in 1500 ml of distilled water; and 700 g of glutamic acid hydrochloride are dissolved in an additional 3500 ml of distilled water. The solutions are mixed and heated to between 150 and 185°F. A few drops of wetting agent such as "Dispersol L" or "Teepol X" may be added. Both the flux and residue are water soluble and easily removed. The residue is not hygroscopic or corrosive. It is effective for soldering brass, copper, steel, silver, various alloys and also for electroplating nickel, zinc, cadmium, silver and tin. It may be applied after dilution to half strength, and is more active than resin alone but much less corrosive than zinc chloride.

Hills of Hematite

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By RALPH VAILL
Consulting Engineer, New York

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HERNANE TAVARES DE SA, in closing his caustically witty book, "The Brazilians, People of Tomorrow," says, "given a helping hand, given intelligent, honest, inspiring leadership, this people will rise to the challenge, will build the Brazil of tomorrow." This he says after knocking their collective ears well back, all through his interesting book.

Ten years ago, in November, 1937, a dictator who had promised to return the government to the people changed his mind and fastened more strongly than ever his grip on the direction of affairs. In the elapsed ten years Brazil has gone a long way into its tomorrow. It began that ten-year march still in the shadows of a great depression, in a time when it was yet unable to resume payment on its foreign obligations, a service interrupted in 1930. It began this march by taking the necessary first step, i.e., abandonment of the foolish policy of subsidizing coffee. With this burden removed, a Brazilian could raise his head and survey his situation. It was bad. The government-owned railroads were in need of rehabilitation. They could not bring the products of the interior to the coastal cities. Immigrants of all kinds were needed if speed were to be gained in any program of economic rehabilitation of the whole nation, but no plan to select or transport them existed, and no capital was available to locate and find them.

There is an international urgency in the solution of the problems of Brazil, problems which they themselves would, given time, resolve in their own evolutionary way. Their venture at Volta Redonda is a sample of what can and will be done, there in Brazil, when their men with courage, foresight and zeal really put their minds to it.

Col. Soares, now governor of the State of Rio, was actually fanatic in his devotion to this project. The result is a great steel plant functioning better than any one dreamed, the first great steel plant of the continent. That was a joint enterprise, Brazilians and Yankees collaborating, in which was maintained to the end the partnership of Yankee dollars and know-how

In this, the third and last article of the series on the iron ore of Minas Gerais, Brazil, the author predicts that never again will a ton of iron ore go into a furnace so cheaply as did the iron ores of the Mesabi. As it stands today, the ore of Minas, mined in primitive ways and loaded by hand, can be put on steamers at about $6 a ton, but the author points out that spot cargo freight to Gulf or Atlantic ports is nearly $6. Superb quality of this iron ore may be the controlling factor, he indicates, in reporting on the experience of Volta Redonda, which used the ore in making cold-rolled strip to specifications of U. S. steel companies, and obtained a product after cold-rolling in which 80 pct reduction was obtained, and prior to annealing, was softer than 78 Rockwell.

with the resources, human and physical, of Brazil. Two other ventures of somewhat similar nature did not fare so well. Both of these, "The Industry of Motors" and the "Valley Rio Doce Project," have languished because they dissolved too soon that same fine partnership that finally brought the National Steel Co. to successful functioning.

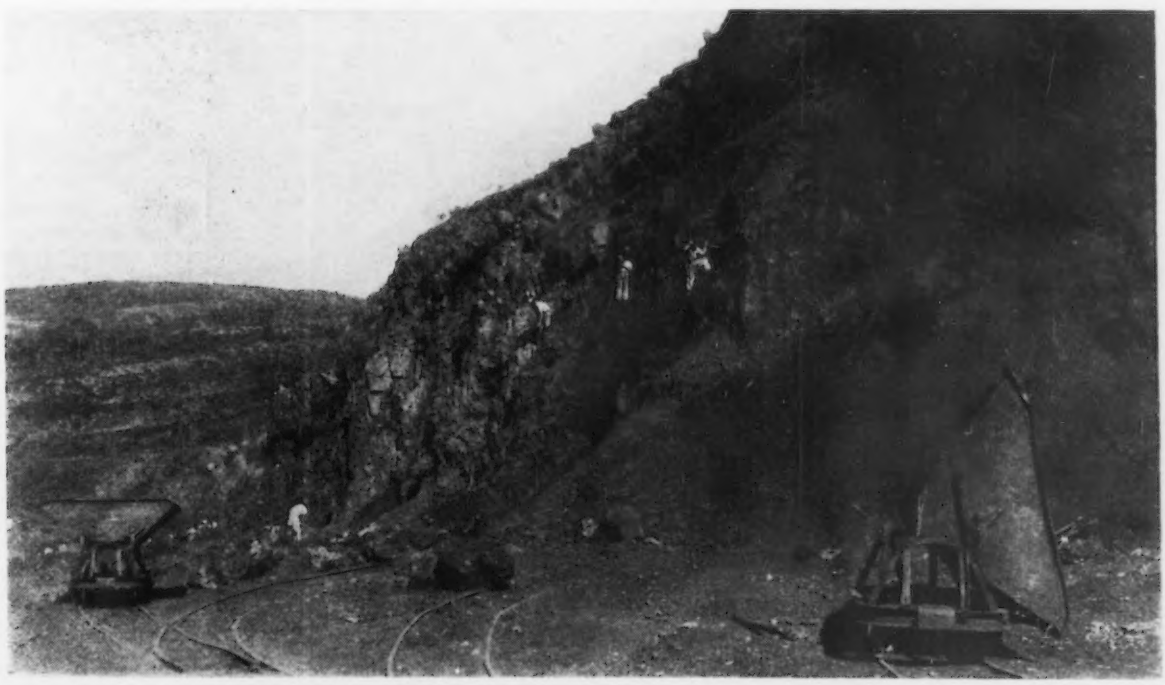
The unbiased, true history of each of these three enterprises must be studied by both Brazilians and Yankees and the lessons to be gleaned therefrom well learned before any extensive joint enterprise to build the road from the furnaces of North America to the ore mountains of Brazil should be undertaken.

This eventual movement of iron ore will be a giant task requiring financiers, men who know how to get 100 cents for a dollar. It will require men of skill in maintenance of good diplomatic relations, and men of competence in the broad fields of international, social and political economy. Over and beyond the great and important jobs of selecting the type of ore freighter, building docks, of equipping railroads, finding buyers and sellers, of digging up something to use for money and governing its use, there is need for historical, sociological, ethnic and political understanding.

If we approved the undertaking as a pure business venture in which business men invest money at a risk for a profit, how does each of the X, Y, and Z of the equation look. Call X the money. Y is the risk and Z the profit. All of the activities of an enterprise carried on within the territorial boundaries of Brazil must be at least 51 pct owned by Brazilians, or by the government. Thus the portion of X necessary to build adequate docks, revamp transport, mechanize the mining, etc., that will require foreign capital, will be 49 pct of X.

That portion necessary to provide proper type and number of ocean carriers, plus the cost of ore and coal docks, storage yards, etc., at Gulf and ocean ports could be all foreign capital.

FIG. 9—Upper bench of the Casa de Pedra development. One of the two Brazilian ore properties developed to any extent, it is believed that the mine could pour out 10,000 tons per day.



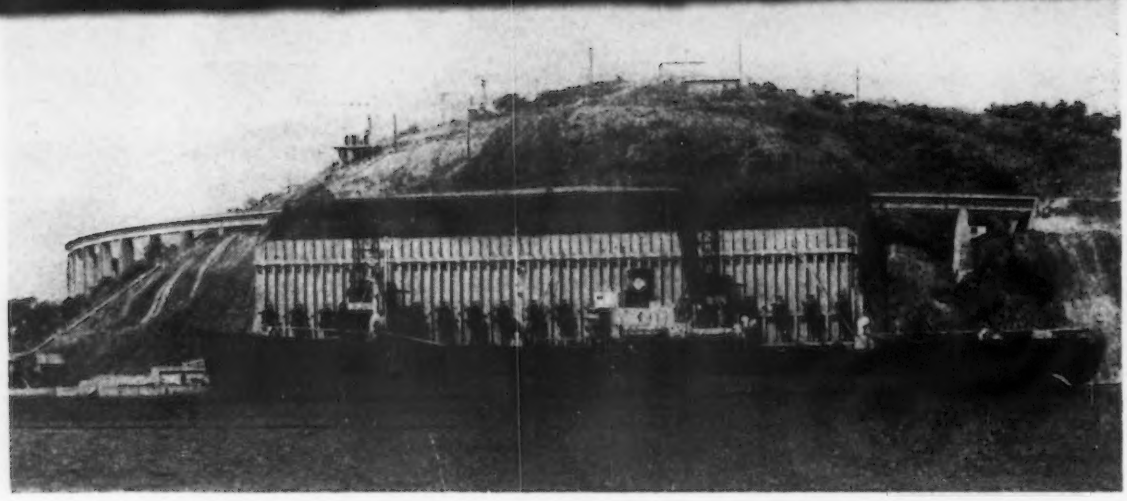


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FIG. 10—Ore docks at Vitoria. Photo courtesy of Standard Oil Co. of Brazil.

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Since we are committed under the ERP to succor western Europe, the Joint Enterprise should include the provisioning of England, Germany, Belgium, France and Italy with these pure ores so that their steel industries will have the most favorable conditions for resumption of production.

Manifestly the tonnage of the ores of Minas that could be used in world reconstruction, and because of their great value should be used, is enormous. Ten million tons per year to these European countries is a minimum estimate. Not one of them has an iron ore that is fit to be used in the urgent work of rehabilitation, except for the ores they can obtain from Sweden and Norway and these ores lie under the shadow of Russia.

The amount needed in the USA is the big question. It could be 10 million annual tons and it could be 20 million tons. Thus, the annual tonnage to be mined, crushed, sized, and distributed by a Joint Enterprise can conceivably be 25 million tons.

So, how big must *X* be? Without doubt, the great miners and handlers of ore such as U. S. Steel Corp., Bethlehem, Pickands-Mather, M. A. Hanna, etc., out of their vast experiences, and because of their American excellence in cost accounting, could tell you in short time just how many dollars should be invested in capital for each annual ton that is sold.

Never again will a ton of iron ore go so cheaply into smelting furnaces as did the ores from the Upper lakes. Not even the ores of Brazil into furnaces of Brazil, for the ore of Brazil must compensate the cost of the coke. As it stands today, the ore of Minas, mined in primitive ways and loaded by hand, then transported over fearfully conditioned railroads and loaded at woefully inadequate ports can be put on steamers at about $6 a ton. Spot cargo ocean freight to a Gulf port or an Atlantic port is nearly $6. On

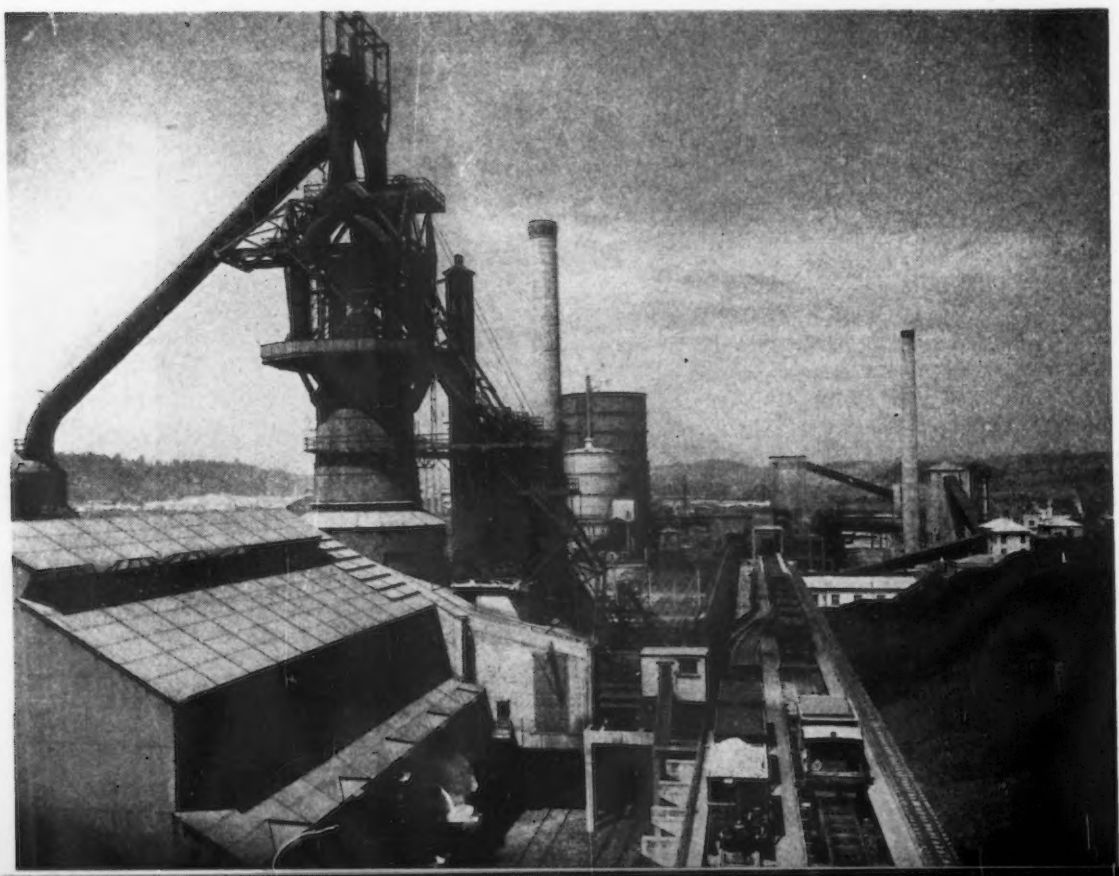

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FIG. 11—The 1200 ton blast furnace at Volta Redonda turned out 180,000 metric tons of pig iron in 1947, its first full year of operation.

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that basis, 25 million tons per year is a gross business of $300 million on ore alone.

Obviously, these ore carriers are not returning empty to Brazil, and therein reposes another sweet little problem. Except for a certain tonnage of coal, Brazil requires very little in the way of bulk cargo imported. A need for a bulk material must be created. This most probably will come automatically, if the future price of coal for industrial purposes in Brazil can be made competitive with imported oil and if the iron industry is converted from charcoal as fuel to coke. If, then, the return coal cargo is half the tonnage of the exported ore cargo and the coal cif Rio is $8 a ton, approximately $100 million more dollars is added to gross.

In two preceding parts of this article, THE IRON AGE, *Dec. 16 and 23, 1948, the author discussed the occurrence and quality of the ore found in the Minas Gerais region and considered the effect of the Brazilian politico-economic situation on the development of the ore fields.—Ed.*

In order to conduct this gross business, that part of the Joint Enterprise outside Brazil will handle 2500 cargoes of 10,000 tons of ore, and 2500 cargoes of 5000 tons of coal, or at 320 working days per year, practically eight cargoes loading and eight unloading per day in Brazilian ports.

If this job were to be handled in the true Yankee style, it would resemble the present gigantic shuttle on the Great Lakes. For if the task at the turn around is possible each 35 days, there would be required 250 ore carriers, and 20,000 officers and men. Add to this the cost of terminal facilities at strategic ports and you have the approximation of *X* outside Brazil.

Within Brazil the question of *X* is more perplexing. There are only two ore properties developed to any extent, that at Casa de Pedra, near Congonhas do Campo, belonging to the National Steel Co., and the Getulio Vargas Mine on Mt. Caue belonging to the Valley Rio Doce project. Casa de Pedra is 6 miles from the railhead. Its ore is transported by two cableways with buckets of 1000 lb capacity. It is a mervelous ore property.

Here the end face of a hogback mountain is opened by six benches, fig. 9, each 60 ft in height, all in solid iron ore and from 0.2 to 0.3 miles in length. The strike of the ore body seems nearly horizontal. They say it extends for more than 1 1/3 miles back into the ridge. If the railhead were electrified, and cut through difficult terrain to the mine, and real modern mining, crushing and loading put in, that mine could pour out 10,000 tons per day.

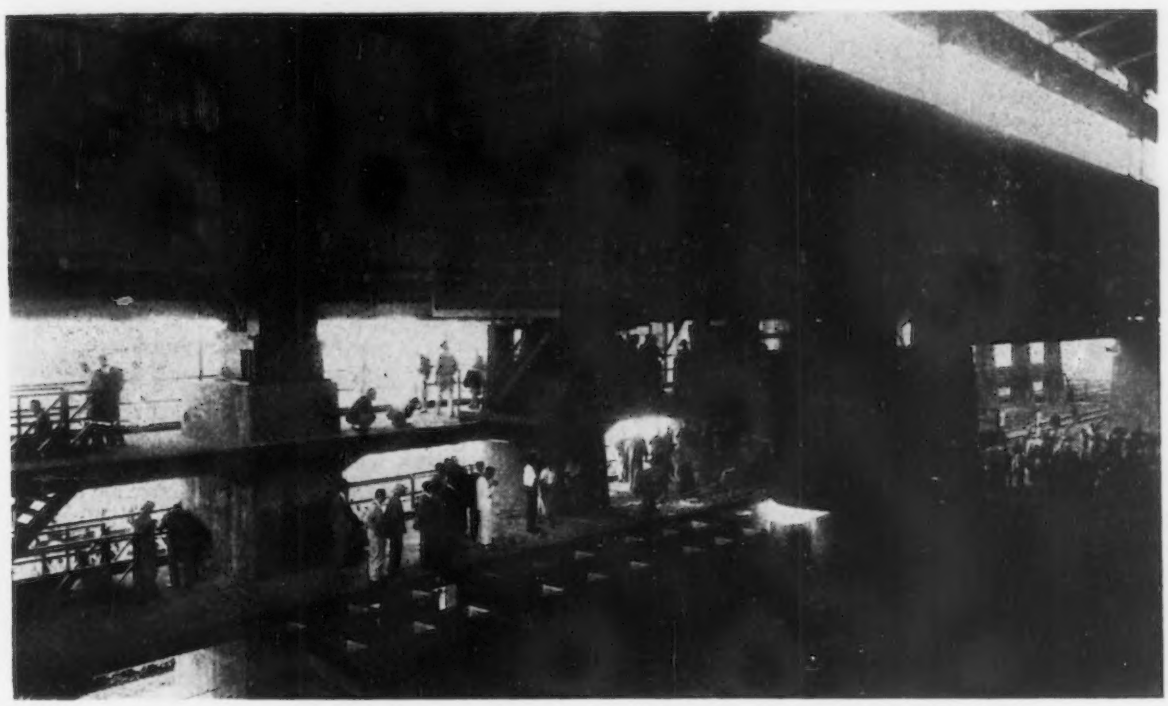

FIG. 12—Pouring ingots at the Volta Redonda plant.

About 15 or 20 miles away, on the central of Brazil also, is the incomparable Pico Itabirito of 70 pct hematite with les than 1 pct total impurity. It also is 10 miles from the rail line. Some skillful and expensive engineering is needed to get the railroad connected to the mine for tonnage operation. These two mines alone could and will get out more ore than it will be possible for the Central of Brazil ever conceivably to haul without enormous expense. Even at that, it will be necessary to erect docks and do much port work at Mangaratiba — somewhat south of Rio, as the rail entrance to Rio, and the general port set up would also never permit the entrance and exit of 20 ore trains a day without enormous expenditure.

Since the joint enterprise herein planned contemplates 80,000 tons per day, it would appear that Valley Rio Doce and scattered suppliers must send down to the sea nearly 60,000 tons

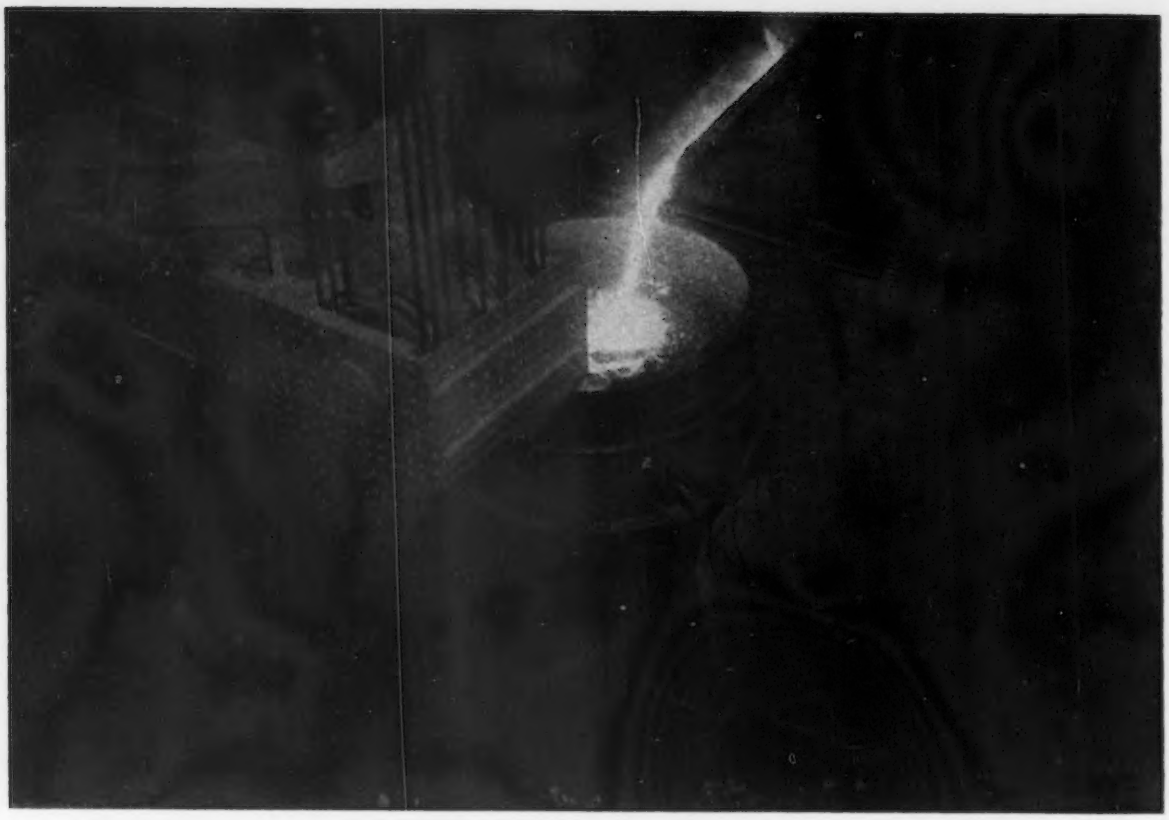

FIG. 13—Tapping an openhearth. Volta Redonda steel goes primarily into structural shapes.

per day. There is sufficient ore at headwaters of the Rio Doce. There is no doubt of that. The Getulio Vargas mine on Caue already considerably mechanized, can easily get out as much ore or more than either Casa de Pedra or Pico Itabirito.

In addition, there are the two mountains, Esmeril and Caete, that are nearly as easy to exploit and in the same general vicinity. The Vitoria-Minas Railway, from Vitoria to the ore mountains, is being rebuilt and made capable of carrying 1500 ton revenue loads on a meter gage. This would mean 40 trains per day downhill. Facilities at Vitoria, fig. 10, could not begin to handle this, but there nature has been kind. At Santa Cruz, quite a distance north of Vitoria in the same state of Espirito do Santo, a good harbor exists. At moderate expense a rail line could be built to connect Santa Cruz to the Vitoria-Minas line. This cutoff would save much. The harbor and docks at Santa Cruz could be made to handle 40,000 tons per day. Thus *X* in Brazil would be 49 pct of the sum needed to realize the above. Any good group of harbor and dock, railway, and mining engineers could prepare a prospectus on this item in six months.

If it were as simple to evaluate *Y* as it is to get the bee-line on *X*, the Joint Enterprise would have been functioning long ago. Before the odds against Joint Enterprise can be computed, the best brains of Brazil and the USA have got to get together and remove the international bugs in the design—of which there are plenty.

Unless and until a formula can be found which will give to Brazilians a complete feeling of mutuality of effort, sacrifice, gain, prestige and participation, no collective effort will succeed.

Unless a way can be found to remove from the Yankee mind the fear of future governmental abrogation or confiscation, no private capital from the north could be enticed into an undertaking so huge.

Until a sufficient number of men of power, wealth, place or influence in each country are assembled and are in possession of satisfactory assurances and guarantees from the other, and have faith in the correctness and purity of motive of the other, no intelligent or lasting modus operandi can be written.

The Anglo-Saxon mind and the Latin mind do not reason from the same premise. All of Latin America has been infected with the poison of suspicion of Yankee imperialism. All of the Anglo-Saxon part of North America remembers only the "oil deal in Mexico."

In the last 25 years, Europe and England have defaulted $1000 for every $10 bond that has not been serviced by Latin America. We of North America read in Chapter 21 of the little book, "Brazilians—People of Tomorrow," by Hernane de Sa, that Brazilians (a) won't work together as a team and therefore no real corporate business is done, (b) won't stick to a job until it is mastered, (c) are ungrateful and hate to give credit for work well done, (d) detest detail or manual labor, (e) will not admit lack of knowledge or experience and, rather than learn, will take your time in trying to tell you how it is done.

People who have lived and worked in Brazil can amplify that list of shortcomings. After three or four weeks battling the various govern-

ment departments concerned in getting permission to send money out of Brazil, get baggage into it, get permission to engage in business in it, or what not, the average Yankee would tell you that you had holes in your head if you proposed doing any extensive job with them.

Probably the hardest obstacle to hurdle is the fact that government in Brarzil is in business to such an extent that the nation really lives under a socialized economy, a condition further aggravated by the fact that states of the Federation are very sovereign and add various degrees of state socialism to the federal socialism.

Since Brazilians are, per se, individualists, and since Brazil is a country with 80 pct of the people very illiterate and very poor in worldly goods, and since private money and the means of production are not sufficient to meet the needs of the country, there is no good hope that the government will recede from its place in commerce and industry. Furthermore, no government would last one week which could rightly be proved to have surrendered any of the national patrimony to a giant foreign concern. Therefore, if this hurdle cannot be cut down to Joint Enterprise size, the tote board will quote odds too long for even the greatest long shot plunger of all—Uncle Sam.

That obstacle can be reduced. There exists in Brazil today a national discontent that is on the side of Joint Enterprise. Politically, Brazil is healthier than at any time since the administration of president Rodrigues Alves.

There is a good slow ferment of liberalism in the Army. In the later repressive days of Vargas, the dictator, these young army people, to express their liberal aspirations, flirted with a bastard form of Communism. They were not Communists. They were liberals seeking a leader, and an economy in which they themselves and their like in civil life could find opportunity for self expression. Outside of the Army there are men in finance like Clemente Faria, president of the Bank of Farmers of Minas Gerais; Correa Castro, the Minister of Finance; Henrique Dumont Vilhares and his brother, Luiz Dumont Vilhares, Senador Roberto Simonsen, the great economist Joan Daudt d'Oliveira, and a host of others who are serving the needs of the national economy and have power to influence opinion and government.

One of the greatest utilities on earth, known throughout the length and breadth of Brazil as "Light," owns, operates and manages the electricity, city gas, and tramways of Santos, Sao Paulo and Rio and in spite of giving good services to these cities at low rates, makes money. General Electric, General Motors, Westinghouse, du Pont and Union Carbide are in Brazil. They took the hurdle and are paying off a fair profit.

It is said of Brazilian industrialists that if they are making only 100 pct clear profit there is a depression on in Brazil. Since Dutra began his job of putting Brazil on a working basis as a democratic institution, the country has weathered the depression effects of the death of hundreds of wartime mushrooms. It has passed through a time of changing values without serious banking troubles. It has prevented undue rise in money in circulation. It has carried the load of the new enterprises, i.e., National Steel Co., Industry of Motors and Valley Rio Doce Project, with their total capital investment of over 8 billion cruzeiros, or half the total in circulation, without undue hardship to its people. It bought one of its railroads back from England and is buying another. In the 10 years since 1937 living costs have tripled. At Volta Redonda, in the past four years wages have doubled. But better than that, new jobs are created which because of machinery employment allow a man working 350 cruzeiros per month in 1940 to make now over 2500.

There is very little doubt today, as this is being written, that the Western world will be called upon to preserve for the world the way of life we cherish. If that demands that we engage in war again, it will mean that every useful thing in our hemisphere must be placed in the hands of useful people so that we will have the power and wealth to win.

The ore of Minas is a perfect thing. The best grade of that ore, knon as hematite compacta, contains 68 to 70 pct pure iron. It contains,

FIG. 14—Night view of part of the Volta Redonda installation.

therefore, never more than 2 pct total impurity and is free of moisture. As Dr. Joseph of the University of Minnesota proved, this ore is very reducible, being third on a list of all ores that he tested. This ore exists in tonnage sufficient to furnish all of the iron that will be required by the impending struggle.

Then there exists the second most useful ore, the itabirite, an ore that contains generally about 6 pct impurity and which is probably more reducible than the hematite compacta. Volta Redonda, the new plant of the National Steel Co., shown in figs. 11 to 14, used these ores entirely to make the iron rerquired for steelmaking. This was the first time in history that these perfect ores had been so exclusively employed where coke instead of charcoal was the smelting fuel.

The performance of these ores, at this new plant, conclusively proved that their practical value is even greater than the theoretical value indicated. Volta Redonda made rail steel and shell steel with ease and of a quality not surpassed anywhere. Never was one test rail broken by the standard drop test.

Hot and cold-rolled strip steel were produced with great ease. They showed physical characteristics of pliability and ductility that were considered fantastic by the internationally experienced operators of the hot and cold strip mills who initiated operations of these departments.

In technical jargon, in order to secure a sufficiently soft and ductile cold strip, it was always found necessary to anneal the strip after cold-rolling, even when it was of a chemical composition as low in carbon and manganese as it is economical to make. Normally, it is difficut to get a steel as soft as Rockwell 78 after cold-rolling. The steel at Volta Redonda, made to chemical specifications of U. S. steel companies, after cold-rolling in which an 80 pct reduction was obtained and prior to annealing, was softer than 78 Rockwell. This is a pure indication of an almost unheard-of cleanliness of the steel.

The last war required 100 million tons of steel per year. This was made by the most useful people in the steelmaking world, the steelmen of the United States. It was made from the ores of the Great Lakes region. Ores that contain less than 55 pct iron, more than 15 pct impurities and moisture; ores that require great skill to convert to the steel that liquidated Hitler and Hirohito.

In the next war, the enemy will have the fine Krivoi Rog ores; the fine ores of the Urals such as of Magnet Mountains. He will probably have the ores of Sweden, Norway or Finland. In 1936 he was already a very useful fellow in using these useful things. But the ores of Minas give us the edge. Let's take it.

Rotating Fixture Facilitates Tank Welding

A ROTATING fixture is used in positioning the bodies and heads of mild steel water tanks during welding of the heads to the bodies. The fixture, shown in the accompanying illustration, is used by the Michiana Products Corp., Michigan City, Ind. It accommodates tanks of 30 to 80 gal. capacity having 10 to 20 in. diam. Tanks are mounted on rubber tired rollers on two shafts, one shaft being driven by a constant speed motor through a Reeves pulley setup by which the roller speed and, consequently, the tank rotation can be controlled to suit the diameter of the tank.

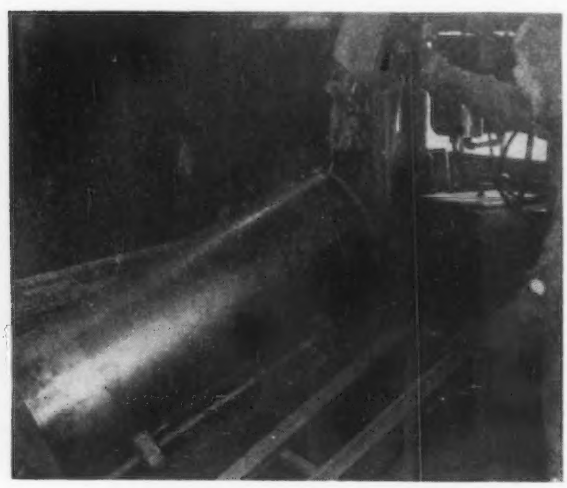

FIG. 1—Rotating fixture employed at Michiana Products Corp. for welding heads in low-carbon steel water tanks. The tanks are turned at a welding speed of 40 ipm by a motor and Reeves pulley drive.

Setting is made so that welding is done at a speed of 40 ipm. It is essential to provide a good ground and this is done by a plug at the top and a second ground at the bottom. Tops are dished stampings that make a close press fit inside the barrels, which previously are rolled to shape and lap welded at the seam.

The fixture is cradled and is set in horizontal position for loading, after which it is turned to the inclined position shown to make the weld. Control of position is by plungers that are air actuated by a valve operated by a hand lever. When in welding position, the operator merely closes a toggle switch and the weld is made automatically as the tank turns through one complete revolution under a welding head supported from a horizontal pipe.

Shieldomatic wire, whose flux covering is applied in a helix around the grooved mild steel core, is employed in a Hollup Shieldomatic adapter head designed for uncoated wire. The wire is fed by a dc Westinghouse motor connected to an ac exciter and rectifier. Feed of the wire is governed by arc voltage, there being an automatic pause in the feed as the arc is struck. Two 400-amp Hollup welders supply current.

When the weld is completed, the tank is rolled onto the inclined frame shown in the foreground of the illustration and slides to the floor, leaving the fixture ready for reloading.

Physical Properties of Titanium Alloys

The titanium symposium held recently in Washington, D. C., under the sponsorship of the Office of Naval Research[1] revealed the widespread interest that has been directed towards the development of this metal by various government agencies and industrial laboratories.

Of the 17 papers delivered at the symposium, five were devoted to the physical and mechanical properties of the metal in its commercially pure, refined and alloyed states. It is intended to present herein the significant data reported by the following authors: C. I. Bradford, Remington Arms Co., "Physical and Mechanical Properties of Commercially Pure Titanium"; F. B. Litton, Foote Mineral Co., "Properties of Iodide Type Titanium"; E. I. Larson, E. F. Swazy, L. S. Busch and R. H. Freyer, P. R. Mallory & Co., Inc., "Some Preliminary Data on Alloys of Titanium"; and H. C. Cross, Battelle Memorial Institute, "Titanium Base Alloys."

[1] *E. S. Kopecki, "Symposium Helps Correlate Titanium Research and Development,"* THE IRON AGE, *Dec. 23, 1948, p. 101.*

Titanium, even in its commercially pure form, reported Bradford, is light, strong, corrosion resistant (sea water) and ductile. Young's modulus for titanium is intermediate between that of the aluminum alloys and steel, while an extremely high melting point and a low coefficient of thermal expansion for titanium may prove advantageous for the high temperature field.

Fig. 1 shows the effect of cold work on the tensile properties of the commercial grade. A significant item is the relatively high tensile

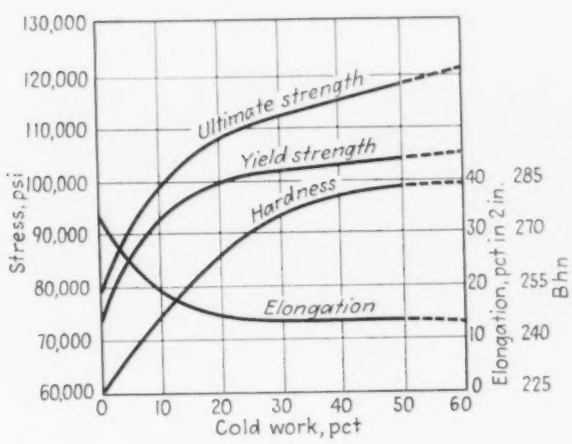

FIG. 1—Work hardening characteristics of commercially pure titanium.

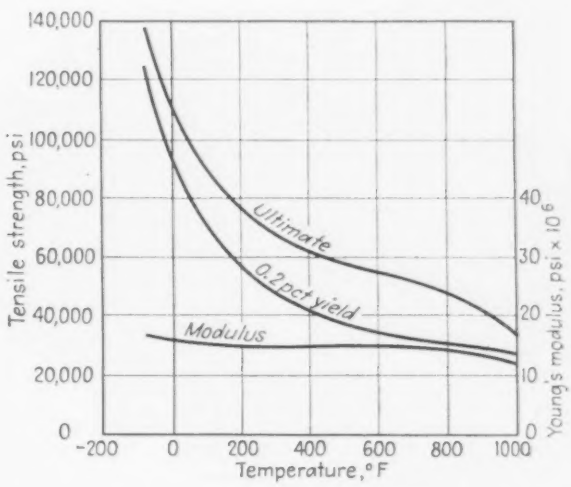

FIG. 2—The influence of temperature on the tensile properties of commercially pure titanium forged bar stock.

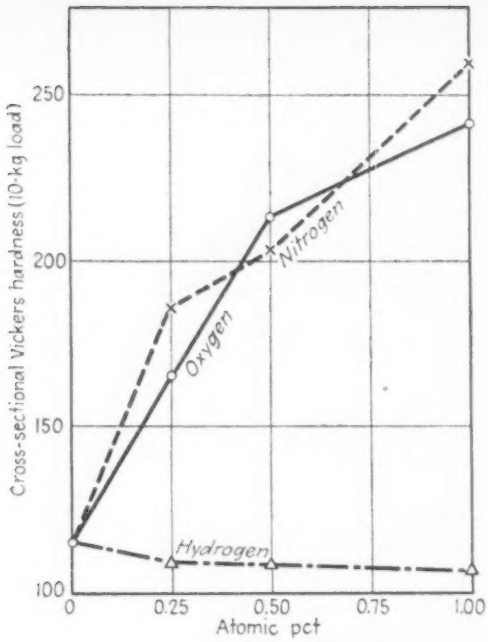

FIG. 3—Average cross-sectional hardness values for alloys of iodide titanium with oxygen, nitrogen and hydrogen.

and yield strength of the annealed material, in combination with good elongation. A second factor is the increase in tensile properties with only moderate amounts of cold work. The tensile properties of forged titanium bar over a considerable range of temperatures are shown in fig. 2. These data represent short-time tensile test results where the specimen is held at temperature about 30 min prior to testing.

Additional tests indicate good subzero ductility, with the elongation of forged titanium bar ranging from 15 to 25 pct between −75° and 800°F. Creep data reveal negligible creep at a stress of 25,000 psi and at a temperature of 600°F; at 800°F, at a stress level of 16,000 psi, an average creep rate of 0.000015 pct per hr was attained over a period of 1125 hr.

The iodide process, held by Litton to be probably the most satisfactory means for producing high purity titanium, is a procedure whereby crude titanium is reacted with iodine in an evacuated bulb at such temperature to form volatile titanium iodides, which are decomposed on a heated titanium filament. A typical spectrographic analysis of Foote Mineral Co.'s iodide deposited titanium is as follows; 0.01 to 0.05 Si, 0.01 to 0.05 Fe, 0.001 Ni, 0.005 Mg, 0.005 to 0.01 Mn, 0.05 to 0.1 Al, 0.01 to 0.05 Ca, 0.001 to 0.005 Cu, 0.05 to 0.10 Mo, trace Zn, Sn and Zr not detected.

In its annealed condition (vacuum, ½ hr at 1382°F), sheet iodide titanium shows the following properties—values of sheet cold rolled from rod indicated in parenthesis: ultimate strength—32,000 psi (107,000); yield strength, 0.2 pct offset,—17,5000 psi (90,000); elongation

TABLE I

Physical Properties of Various Titanium Alloys

Alloy, Pct (Bal, Ti)	Working, Pct	Rockwell Hardness, R_A		Ult. Tensile Strength, Psi		Elongation, Pct	
		Worked	Annealed	Worked	Annealed	Worked	Annealed
0.37 Be	70 (C.R.)	64	59	115,000	93,000	3.2 (in 1 in.)	25 (in 1 in.)
	71 (C.R.)	66	61	124,000	88,000	3 (in 1 in.)	12.5 (in 1 in.)
1.07 Be	77 (H.R.)	61		96,000		4.5 (in 2 in.)	
	77 (H.R.)[1]	69		151,000		3 (in 1 in.)	
	77 (H.R.)[2]	57		82,500		3 (in 1 in.)	
	77 (H.R.)[3]	61		101,500		6.25 (in 1 in.)	
	77 (H.R.)[4]	53		68,500		6.25 (in 1 in.)	
0.33 Al	77 (H.R.)	65	62	106,500	91,400	6.25 (in 2 in.)	12.5 (in 2 in.)
2.64 Al	77 (H.R.)	66	62	118,000	109,000	6.25 (in 2 in.)	7.8 (in 2 in.)
0.33 Al	77 (H.R.)[5]	65	..	159,000	.....	3 (in 2 in.)	.....
2.64 Al	77 (H.R.)[5]	67	..	155,000	.....	3 (in 2 in.)	.....
0.98 Indium	73 (C.R.)	67	60.5	132,500	100,000	none	7.8 (in 2 in.)
	76 (C.R.)	63	63	110,000	106,800	4.7 (in 1 in.)	12.5 (in 2 in.)
1.28 C	77 (H.R.)[6]	63	..	137,000	114,500	4.6 (in 2 in.)	8.3 (in 2 in.)
1.18 C	77 (H.R.)[7]	..	..	104,600	96,700	12.5 (in 2 in.)	19 (in 2 in.)
1.06 Si	80 (C.R.)	71	64	160,800	113,700	1.5 (in 2 in.)	4.3 (in 2 in.)
4.06 V	82 (C.R.)	68	..	153,000	.....	none	.....
10.21 Mo	77 (H.R.)	66	62	.....	110,000	.....	none
	77 (H.R.)	68	66	.....	135,000	.....	3.9 (in 2 in.)
3.53 Mn	70.7 (C.R.)	70	68	.....	147,000	.....	3 (in 1 in.)
5.62 Mn	77 (H.R.)	69	..	164,000	.....	4.5 (in 2 in.)	.....
4.30 Mn	77 (H.R.)[8]	69	66	.....	138,000	.....	9.4 (in 2 in.)
6.02 Mn	77 (H.R.)[8]	69	68	.....	101,000	.....	none
7.22 Mn	77 (H.R.)[8]	69	69	.....	164,500	.....	none
13.00 Mn	77 (H.R.)[8]	72	64	.....	141,000	.....	6 (in 2 in.)

[1] 1832°F; water quench; Properties as heat treated
[2] 1832°F; slow cool; Properties as heat treated
[3] 1562°F; water quench; Properties as heat treated
[4] 1562°F; slow cool; Properties as heat treated
[5] Cold swaged 65 pct
[6] Cold swaged 19 pct
[7] Hot swaged 88 pct
[8] Followed by anneal

in 2 in.—55 pct (2.5); and reduction of area—6 pct (30).

The alloying of titanium with oxygen, nitrogen and hydrogen, reported by Cross, was performed by the gas absorption and diffusion method using iodide titanium as the starting material. The general procedure consisted of adding known volumes of the various gases to an evacuated system within which the titanium, in the form of wire, was suspended. The wire was then heated to the proper temperature for a required time interval to obtain absorption and uniform diffusion.

Hardness tests, see fig. 3, were somewhat erratic for the oxygen and nitrogen alloys, but indicate that oxygen and nitrogen harden titanium to about the same extent with nitrogen possibly having the greater effect. Hydrogen up to 1 atomic pct (0.021 weight pct) does not increase the hardness of iodide titanium, and actually appears to decrease it slightly. In fig. 4 one can see that nitrogen has a considerably greater strengthening effect on iodide titanium than oxygen, increasing the tensile strength almost threefold, while for oxygen the increase was about twofold. Nitrogen correspondingly decreases the ductility to a greater extent, while hydrogen appears to have a very slight strengthening effect, although this indication may be the result of variations in the initial material.

The effects of various alloying elements are shown in fig. 5. Molybdenum, tungsten, columbium and tantalum in amounts up to 20 pct increase the tensile and yield strengths progressively. Chromium has the same effect, but only in the alloys with chromium up to 10 pct, because of the excessive amount of inter-metallic compound present in the 20 pct Cr alloy. The strength levels attained even at 20 pct additions by these alloys prepared by powder metallurgy methods are not so high as those shown by arc-melted alloys with less than 4 pct W and with additions of oxygen and nitrogen. So, while the data show strengthening effects for chromium, molybdenum and tungsten additions, their greatest usefulness may well be in combination with other additions.

The tensile properties of ternary alloys of chromium, molybdenum, or tungsten with titanium are slightly better than those of the binary alloys with equivalent alloy content.

An investigation of titanium and titanium-rich alloys, in the hot-rolled, cold-rolled and annealed conditions, was reported by Larsen, et al, employing powder metallurgy methods. A correlated physical property study of various alloy combinations is outlined in table I. Of the alloy systems investigated, the authors indicated the following as being the most interesting from a practical standpoint: (1) Aluminum alloys containing up to 5 pct Al; (2) manganese alloys containing about 5 pct Mn; (3) beryllium alloys containing up to 1 pct Be; (4) boron alloys containing up to 1 pct B; and (5) silicon alloys containing up to 1 pct Si.

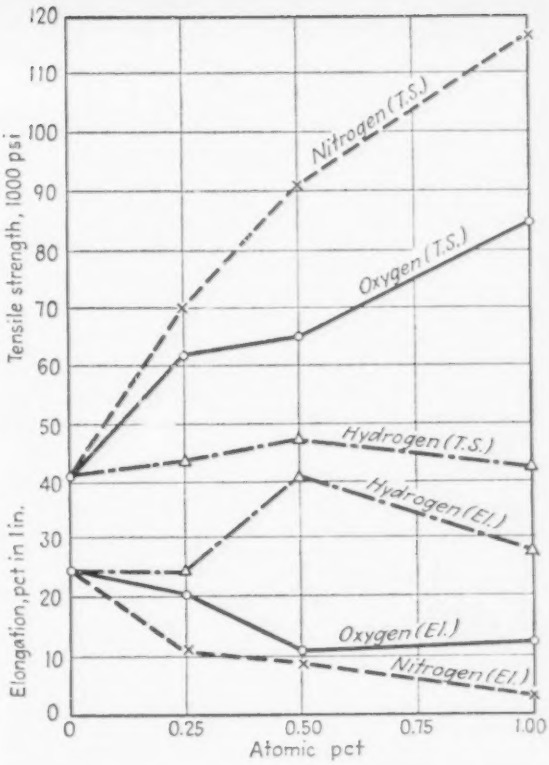

FIG. 4—Tensile strengths and elongations of alloys of iodide titanium with oxygen, nitrogen and hydrogen.

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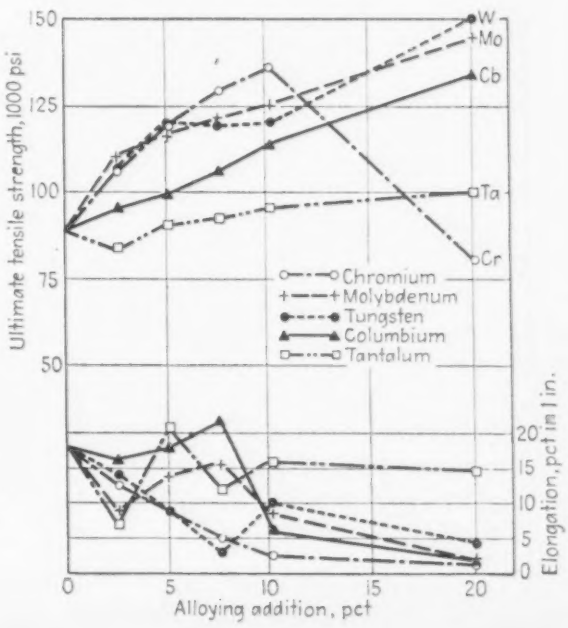
FIG. 5—Effect of chromium, molybdenum, tungsten, columbium and tantalum on the tensile strength and ductility of titanium. Alloys have been hot rolled at 1650° F and furnace cooled, and have been prepared by powder metallurgy methods.



Aptitude Tests For

Hiring inexperienced personnel involves an element of risk which can prove costly in plant operation. This article describes aptitude tests developed to minimize such risk in the hiring of squeezer molders for gray iron foundry work. By first trying the tests on workers of known ability, the company was able to establish standards which were then applied in the hiring of inexperienced applicants.

BUILDING a new foundry in the backwoods is not particularly difficult, but obtaining the proper personnel to run it is something else. In 1945, Grede Foundries, Inc., Milwaukee, decided to establish a gray iron foundry at Kingsford, Mich. This area, called Iron Mountain, offered a substantial labor supply, but none of the potential workers had any previous foundry experience. In fact, very few had any industrial experience at all.

In an effort to hire the proper type of worker, a series of aptitude tests was prepared for the company by Paul Mundie of Rohrer, Hibler & Replogle, psychological consultants. Using the experienced personnel of the Liberty Div. of Grede Foundries, tests were given to workers in order to evaluate the reliability and validity of the possible tests which could be given at Iron Mountain. The results of these tests were compared with the worker's reputation, earnings and ability. Out of 10 tests given to the skilled experienced help, four were discarded and the remaining six were chosen as the group to be given the applicants at Iron Mountain.

To decide the merits of the results of the tests given the experienced workers, a committee consisting of the foundry superintendent, the personnel manager and the production control foreman was formed. This committee reviewed the result of each test and weighed the result against their collective opinion of the man who took the test. When the three jurors could not agree as to any particular man's ability, either superior or inferior, the test was not considered. The results of tests on which there was agreement as to the worker's rating were pooled and from this data the validity of the technique was determined.

Two variables entering into the consideration of an employee's worth had to be carefully watched. One was that in some cases super-

TABLE I

Aptitude Test Scores Made by Molders at the Iron Mountain Plant Compared With Supervisor's Rating.

WORKER	TEST SCORES							
	Patterns	Personal Problems	Inspection	Mechanical Information	Figure Assembly	Spatial Relations	Combination Score*	Supervisor's Rating
A	161	22	70	18	25	17	1102	Good
B	109	16	57	17	27	8	865	Fair
C	202	26	74	21	30	19	1286	Very good
D	167	26	79	18	17	22	1142	Good
E	51	24	59	14	16	9	793	Fair
F	219	27	80	18	20	25	1291	Good
G	173	24	85	15	16	21	1117	Good
H	133	23	72	10	15	10	868	Poor
I	219	23	44	12	26	11	1021	Good
J	103	26	74	17	21	15	1034	Fair
K	116	26	64	15	23	13	999	Poor
L	19	18	30	13	13	6	582	Very good
M	219	18	72	12	22	28	1233	Poor
N	149	20	85	12	24	15	1033	Poor
O	121	24	73	15	20	16	1017	Very good
P	161	11	75	16	19	18	926	Good
Q	159	16	66	12	26	16	981	Fair
R	145	21	81	16	24	13	1027	Very good
S	172	22	62	12	19	15	983	Fair
T	225	18	60	12	26	18	1092	Good
U	173	23	59	10	31	8	1002	Good
V	82	27	42	12	25	10	907	Good
W	151	17	70	17	23	8	900	Poor
X	163	73	69	20	23	23	1180	Very good
Y	82	27	52	24	25	17	1083	Very good
Z	94	19	68	12	23	10	857	Fair
AA	213	24	57	13	24	12	1053	Good
AB	105	22	53	10	11	10	754	Very good
AC	88	14	45	10	16	8	646	Very good

* Combination score = 1 × Patterns test + 12 × Personal Problems + 2 × Inspection + 6 × Mechanical Information + 9 × Figure Assembly + 12 × Spatial Relations.

Foundry Molders

By D. I. BROWN
Chicago Regional Editor
THE IRON AGE

visors had high regard for individuals irrespective of the man's actual ability. An attempt was made to allow for this factor, termed "halo" by the psychologist supervising the project. Another factor which in cases had to be allowed for, was a worker's earnings. Some molders were regarded as "hungry," judging from the work they turned out. In other words, a man's earnings, it was found, are not always commensurate with his ability, skill, intelligence, or other basic characteristics.

After this period of test analysis, in which every effort was made to choose fair testing methods, six tests were adopted and given to applicants at the new shop in Iron Mountain. Portions of two of the tests are shown in figs. 1 and 2. The personnel director of the new plant then took the results, interviewed each applicant orally, and through his own impression of the man and the test results decided the fitness of the man as a potential squeezer molder.

visor's judgments of the ability of the molders. To check the validity of the supervisors' ratings, the same men were asked to re-rate after an interval of about three weeks. A correlation of rate and re-rate of 0.89 indicates that the supervisors were consistent in their judgment of the men. These initial ratings were used as a criterion to determine the effectiveness of the tests. The results of this study are shown in table II.

Production records frequently lack stability due to more extraneous factors such as motivation, attendance and machine breakdown. Although there were within the test group a number of men whose production records appeared reasonably stable, an examination of data indicated that a study using this criterion alone would not prove fruitful.

In the search for the most valuable criterion, it was decided to select individuals whose ratings agreed with their production record. Men, from both Iron Mountain and from the original Lib-

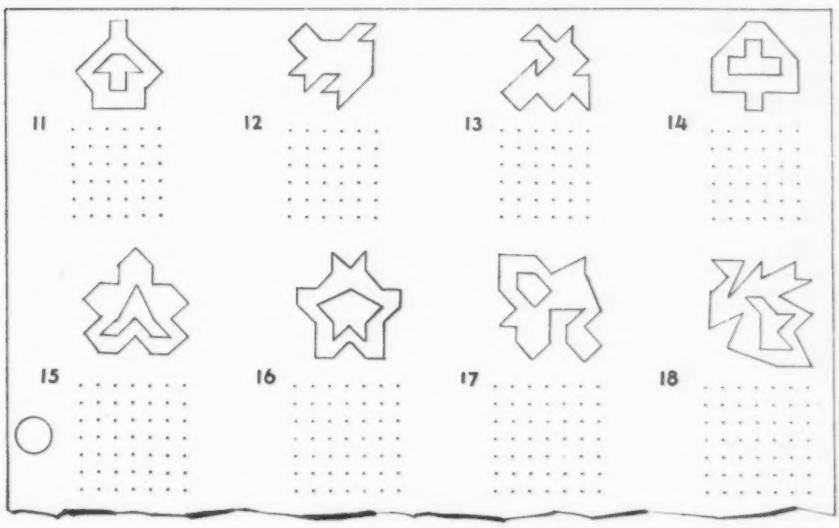


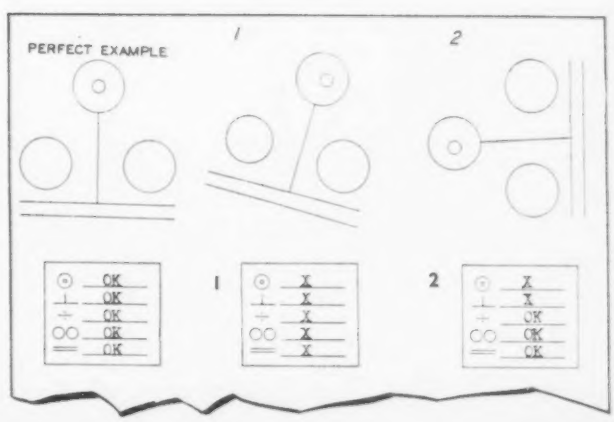
FIG. 1—Portion of the pattern test in which the applicant is asked to copy each pattern by drawing lines connecting the proper dots in the square below the figure.

FIG. 2 — Inspection test calls for visual determination of deviation from the perfect example. It is to be determined whether or not the circles at the top have the same center, if the meeting lines form a right angle, if the upper of the two parallel lines is bisected, if the two lower circles are the same size and if the two long lines are parallel.

Production at Iron Mountain has been very satisfactory. The man running the cupola, who had never before seen molten metal, has done just as good a job as old-time melters in other Grede shops. The division has had only the normal product rejections experienced by the trade. It has made a profit and in every way is considered an efficient, smooth-running organization.

In 1947 the consulting psychologists ran a followup on the testing program. This was done to determine the validity of the method in the case of the Iron Mountain plant and to establish, if possible, a more effective combination of tests.

Table I is a summary of the individual test scores, the combination score and the super-



erty Div. study, whose production records for at least three months averaged 1400 or better per week and who were rated "good" or "very good" by their superiors, were considered superior molders. Those from both plants who were rated "fair" or "poor" and whose average production records for the same period were under 1400 per week, were considered inferior. These stringent criteria limited the study to 24 men, 12 in each group. Table III is a summary of the test results obtained with the two groups.

Two conclusions were reached in the examination of the data: (1) The separate tests are positively related to success as measured by supervisory ratings, with the possible exceptions of the inspection and figure assembly tests, as shown in table II. (2) The test battery as a whole, combined as recommended in the earlier study, is positively related to success as measured by supervisory ratings. However, the critical ratios indicate that a better combination can be obtained.

After studying the followup results, recommendations were made for the future use of the tests in evaluating applicants. It was recommended that the figure assembly test be omitted, and that a score of 550, using the weighting factors applied to the individual test results in table III, be adopted as a minimum for new employees assigned to squeezer molding. A further recommendation was that the company maintain an experimental attitude toward the testing and consider the possibility of similar tests for other jobs in the company.

TABLE II

Averages of Test Scores

NUMBER OF WORKERS	TEST SCORES							
	Supervisor's Rating	Patterns	Personal Problems	Inspection	Mechanical Information	Figure Assembly	Spatial Relations	Combination Score*
18	Good and very good	151	22.2	61.0	15.2	21.7	15.2	1012
11	Fair and poor	132	21.0	68.1	12.7	21.6	13.4	959
....	Differences	19	1.2	−7.1	2.5	0.1	1.8	53
....	Critical Ratios	1.01	0.83	−1.41	1.33	0.00	0.87	....

* See note in table I.

TABLE III

Comparison of Test Scores of Molders of Established Ability and Statistical Treatment of the Comparative Data.

WORKER	TWELVE BEST MEN						
	Patterns	Personal Problems	Inspection	Mechanical Information	Figure Assembly	Spatial Relations	Revised Combination*
A	219	27	80	18	20	25	817
B	202	26	74	21	30	19	759
C	219	23	44	12	26	11	553
D	174	21	42	17	24	14	586
E	173	24	85	15	16	21	713
F	81	15	35	7	14	12	388
G	145	21	81	16	24	13	597
H	82	27	52	24	25	17	711
I	82	27	42	12	25	10	535
J	167	26	79	18	17	22	759
K	134	31	75	18	25	25	824
L	180	23	50	13	25	18	624
Means	155	24.3	61.6	15.9	22.6	17.3	656
	TWELVE POOREST MEN						
AA	50	9	27	5	16	7	244
BB	225	18	60	12	26	18	591
CC	161	11	75	16	19	18	547
DD	7	16	6	12	10	6	324
EE	151	17	70	17	23	8	596
FF	173	23	59	10	31	8	507
GG	213	24	57	13	24	12	592
HH	144	22	54	13	22	9	516
II	51	24	59	14	16	9	518
JJ	16	6	5	4	15	10	202
KK	109	16	57	17	27	8	469
LL	172	22	62	12	19	15	585
Means	123	17.3	49.3	12.1	20.7	10.7	487
Difference between Means	32	7	12.3	3.8	1.9	6.6	189
Critical Ratios	1.29	3.36	1.49	2.28	0.91	3.56	3.63
Biserial Correlations	0.32	0.73	0.37	0.49	0.23	0.74	0.75
Means of Total Sample	139	20.8	55.4	14.0	21.7	14.0	562
Standard Deviations	63	6.0	21	4.9	5.1	5.6	158

* New Combination = ⅓ Patterns + 10 Personal Problems + Inspection + 8 Mechanical Information + 10 Spatial Relations.

Assembly Line . . .

WALTER G. PATTON

• Facts and figures of General Motors make interesting reading for students of the free enterprise system . . . Henry Ford II faces an unprecedented distribution problem.

DETROIT — Among the press group in Detroit, M. E. Coyle, executive vice-president of General Motors, is often referred to as "Mr. Facts and Figures."

Appearing last week before the Congressional Subcommittee on Profits in Washington, the GM executive gave the best explanation yet of what is sometimes referred to as the automobile industry's "Double Profit" system.

According to C. F. Kettering who originated the phrase, the "Double Profit" system requires that *both* the customer and the seller shall earn a profit. According to this theory, if the customer gets more for his money in the form of an automobile than he gets in the form of other commodities, he will buy an automobile in preference to the other commodities and services. Thereby, he earns a profit for himself. At the same time if the seller of the automobile offers a better value than his competitors, he also earns a profit for himself, according to Mr. Kettering. Hence, the "Double Profit" system.

Mr. Coyle's report is a carefully documented analysis of GM's position in the automobile industry. As an intimate history of General Motors it undoubtedly surpasses any of the earlier releases. As an argument for GM's efficient operation and its price and profit policies, the report is the most enlightening this writer has seen. Several who have read Mr. Coyle's testimony in detail rate it the best presentation to date of the free enterprise system successfully at work.

Here's an example: Mr. Coyle argues that GM's outstanding success has been due primarily to its ability to produce, year after year, greater values in the form of lower prices and higher quality, or both for the customer. Under inflationary conditions, he observes, it is not always possible to achieve lower prices although GM still aims at reducing costs in terms of what the customer's dollar will buy.

During the automobile industry's early period of growth, he argues, the improvement in car values was reflected, year after year, in lower prices. More recently, however, increased car value has taken the alternate form of greater roominess, improved performance, durability, appearance, economy and safety.

To drive home this point, Mr. Coyle makes a direct comparison of a present day car with a motor car of 20 years ago. The 1929 Buick, model 27, 4-door sedan, priced at $1320 manufacturer's list price, is compared with the 1948 Stylemaster Chevrolet, 4-door sedan priced at $1280.

The selling price of a 1948 Chevrolet is $40 less than the 1929 Buick, but the power of the present Chevrolet engine is rated at 90 hp compared with 74 hp for the 1929 Buick. The 1948 Chevrolet is 17 miles faster than the 20 year old Buick. Fuel economy at 30 miles per hour was 14.7 miles per gallon for the 1929 Buick and 22.7 for the 1948 Chevrolet. The 1948 Chevrolet is slightly longer than the 1929 Buick and it weighs 539 lb less.

MR. COYLE also points out that the Buick price did not include spare tire and bumpers which are included in the Chevrolet price. He also finds these features in the 1948 Chevrolet that were not available in the 1929 Buick; all-steel body, 4 - wheel hydraulic brakes, safety glass, sealed-beam headlights, syncro-mesh transmission, hypoid differential gears, automatic spark advance, thermostatic controlled pressure cooling system, knee action suspension, low pressure tires, built-in luggage compartment, no-draft ventilation, etc.

During his testimony, Mr. Coyle emphasized the fact that automobile values are much greater today than they were a few years ago simply because automobile prices have risen less rapidly than many other commodities. He points out, for example, that the increase in the price of GM cars has been 75 pct since 1941. Meanwhile, the Bureau of Labor Statistic Consumer Price Index has increased 72 pct although many commodities such as farm products, foods and textiles have increased much more rapidly.

In January, 1941, he argues, it took nearly 2000 lb of round steak at 38¢ a lb to equal the price of a Chevrolet. Today, it takes only 1400 lb of round steak at 93¢ per lb to equal the price of a Chevrolet.

Putting it another way, in 1928 it took an average factory worker nearly 1200 hr to earn the price of a Chevrolet. In 1941 it took only a little more than 1000 hr. Today it takes less than 1000 hr.

There are many revealing facts about General Motors included in Mr. Coyle's recent testimony. The replacement parts business, for example, of GM's five car divisions and the truck division *in terms of tonnage* in the first 6 months of 1948 were at an annual rate of nearly three times of that of 1941.

The GM postwar parts volume includes more than a million automobile engines manufactured to replace worn-out engines in older cars.

From January, 1941, to October, 1948, wages of General Motors' workers have increased about 77 pct. For the same period the prices of a group of basic industrial raw materials has increased 100 pct. Nonferrous metals and some other raw materials used in the manufacture of automobiles have increased more than 100 pct.

THE GM executive argues that in spite of higher prices and higher living costs more people can afford to buy new cars today than before the war. This, he explained, is due to the fact that the number of families has increased by over 10 pct and the average disposable income per family by 1948 had increased 85 pct above prewar. This increase in purchasing however is, he says, greater than the increase in the cost of living index or the prices of low priced cars. He also points out that employment is about 18 pct above 1941.

The distribution of national income is also a factor, according to the GM executive. For example, the incomes of the independent business men and farmers are considerably greater than before the war. In 1939, he argues, when farm prices were low, it took cash receipts from the sale of eight beef steers to buy a Chevrolet. Today the same number of steers bring the price of two Chevrolets. In making this comparison Mr. Coyle has undoubtedly chosen a favorable example but the fact remains that the farm market for cars is indeed a large segment of the total.

General Motors is today carrying $670 million more inventories and accounts receivable than in the 1936-41 period.

Machines, tools and other facilities during 1948 cost about two thirds more on the average than 1936-41. Building construction costs have more than doubled.

Fifteen years prior to World War II GM reinvested, on an average, 18 pct of its net earnings. Since the war, it has reinvested $334 million or 45 pct of its earnings. Yet GM has found it necessary to obtain additional funds on the outside amounting to $223 million.

During the year 1948, GM stockholders received $4.50 per share compared with $3.46 per share in the period 1936-41. However, the 1948 dividend of $4.50 will buy only what $2.65 bought in 1936-41. Hence Mr. Coyle argues, GM stockholders "take-home pay" has been cut.

The GM executive also presented evidence to show that GM's list prices are substantially below those of its competitors. Using a 1941 index as 100, the November, 1946, index (after decontrol) was 150 for GM and 154 for six other companies. At the end of November, 1948, the GM index stood at 175 compared with 189 for six other companies and 210 for four smaller companies.

Mr. Coyle also showed that passenger car prices and metal product prices have increased at about the same rate since 1941. The increase is about 75 pct compared with 164 pct for farm products, 153 pct for foods and 105 pct for building materials.

While the GM statistics have undoubtedly been carefully chosen to present a strong case for General Motors, it is going to be particularly difficult now for others to make nearly as convincing a presentation *against* the corporation. This may be the greatest value of Mr. Coyle's recent testimony in Washington.

DURING his lifetime many of the elder Henry Ford's ideas about charity were strongly criticized by those who watched him making millions which he promptly plowed back into his vast industrial empire. In process, the elder Ford amassed total assets were were valued, in part, on Nov. 30, 1948, at $204,766,630.

The value represents 81.2 pct of the stock of the Ford Motor Co., which is held by the Ford Foundation. The holdings will be increased to 3,089,908 shares or 89.4 pct of the Ford stock when the Henry Ford estate is settled.

As president of the board of trustees of the Ford Foundation, Henry Ford II has the puzzling responsibility of developing a program for utilizing these assets in the most efficient manner "in serving human welfare."

Many Detroit sources agree there is no more precedent for the younger Ford's program than there was for Henry Ford's amazing success as an industrialist.

At the request of the trustees of the foundation, a committee of authorities in the fields of medicine, education, social science, business, political science and natural sciences have agreed to undertake an intensive study leading toward a greatly expanded program for the Ford Foundation. The trustees have asked each of the foundation's advisers to report its findings and make recommendation by June, 1949.

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UNDER THE HOOD: *Powell Crosley, Jr., president of Crosley Motors, Inc., is shown explaining the workings of the Crosley motor to Rita Johnson during the press preview of the car at the Park Lane Hotel in New York. The motor weighs only 59 lb and develops 26 hp.*

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Washington . . .

EUGENE J. HARDY

• Congress seen favoring higher corporate tax rather than new excess profits tax . . . U. S. Steel's income as per cent of sales is lowest, Voorhees says.

WASHINGTON—A tax-wise look at Capitol Hill this week shows that although a considerable number of incoming legislators are whooping it up for an early return to excess profits taxation, a majority of the new Congress remains unconvinced that such an extreme move is warranted at this time.

The chances are that Congress will be much more inclined to enact legislation increasing corporate taxes. Individual income taxes will come up for overhauling also, although increasing the present corporate level of 38 pct may well be the first important order of business.

The growing disinclination to look favorably on proposals to revive the wartime excess profits tax structure is due to several factors. Among these are:

(1) The favorable presentation made by business representatives to Senator Flanders' subcommittee on profits earlier this month. "They made a better case than I expected," the Vermont Republican stated.

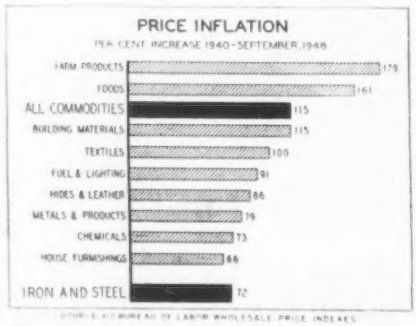
(2) The probability that conservative Democrats on both the House Ways and Means Committee and the Senate Finance Committee will try to scuttle excess profits legislation.

(3) A growing sentiment among President Truman's advisors that the need for an excess profits law may be less urgent than the need to forestall signs of a business recession.

But despite these factors, at least two members of Congress—Senator O'Mahoney, D., Wyo., and Representative Dingell, D. Mich., plan to introduce excess profits legislation immediately after the new Congress convenes. And they are counting on plenty of strong, organized support — particularly from labor—to put their proposals over.

It is significant to note that a memorandum recently prepared by the staff of the Joint Committee on the Economic Report—of which Senator Flanders' profits subcommittee is a part—concludes with the observation that "it is the prospect of profit which moves men's wills," and notes that the levels of profit "are significant principally for the influence they have upon business anticipations."

Expressed another way, the staff is saying, "let's not shoot Santa Claus." However, the staff memorandum does not necessarily represent the views of the committee, either individually, or as a committee. The members of the committee and the committee itself have yet to express themselves on the subject of profits.



Mr. Flanders, meanwhile, concluded 3 weeks of public hearings on 1948 profits with the statement from Enders M. Voorhees, chairman of the finance committee of the U. S. Steel Corp., that U. S. Steel set one record in 1947 that was "on the low side."

MR. VOORHEES said the corporation's income as a percent of sales was 6 pct—"the smallest for any year of anywhere nearly comparable rates of operation in U. S. Steel's entire peacetime history." For the first 9 months of 1948, he added, the return on the basis of sales was "even smaller."

The trouble comes, he said, because of the depreciated value of the dollar in the past 10 years. "When the buying power of the dollar is subject to marked change," he said, "then a blind adherence to original cost results in gross over- or under-statement of depreciation cost, hence to gross over- or understatement of true income, hence to gross over- or under-calculation of income taxes and also to management's gross."

"The continued increase in the cost of goods and facilities during 1948 demonstrated that the 30 pct rate for added depreciation was no longer sufficient to cover the true cost of the property currently consumed," he continued. "In view of this situation, effective as of Jan. 1, 1948, the additional charge was advanced from 30 pct to 60 pct of the depreciation based on original cost. Such total added amount for the first 9 months of 1948 was $39.7 million."

"In 1947," he stated, "U. S. Steel's income was 6 pct of sales; for 9 months of 1948 it was slightly less. Our operating rate has been over 90 pct. How do these income percents compare with the income percents in previous years of comparable activity?

"We have made such a comparison covering all prewar peacetime years. This is what we find; in such past years when the operating

rate was over 90 pct the income pct averaged 18.2, or 3 times as much as in 1947. For years when the operating rate was between 80 and 90 pct, the income pct averaged 11.8, or double the 1947 rate.

"Putting it another way, the amount earned in 1947 of 6 pct was the percentage that was characteristic of prior years when the operating rate ranged from 40 to 50 pct. Historical comparison, in the absence of statistical distortions, can yield only one conclusion: U. S. Steel's current rate of profit is exceptionally low in the light of its present full capacity rates of operation."

EARLIER, H. G. Batcheller, president of Allegheny Ludlum Steel Corp., said that rising wages and rising costs had forced higher prices in his company. He criticized "various experts who do not have to meet a payroll and who labor under the delusion that there is some mysterious way by which business can continually absorb cost increases while prices continue unchanged."

"Even now," he testified, "a campaign is under way for a fourth round of wage increases. If experience is any criterion, further price rises will follow."

The U. S. Chamber of Commerce told Mr. Flanders' subcommittee that "reported net profits today constitute a normal peacetime relationship to national income."

"If we correct reported profits for the nonrecurring inventory markup and the underdepreciation of wearing assets, profits are below their normal level relative to the size and magnitude to the rest of economic activity.

"Whether higher taxes on business would send the economy into a tailspin or stimulate further inflationary pressures would be determined by the relative strength of the deflationary - inflationary forces. The growing number of filled pipelines and soft spots suggests that additional tax levies might be deflationary at this time."

"An equitable excess profits tax is not only almost impossible to design and administer, but is without equity as between small and other stockholders," the chamber stated.

Foreign Outlook For Machinery Brighter As Food Orders Ease

Washington

• • • **Orders for** American-made machinery, equipment and other industrial commodities are continuing to increase. Over the next several months, they will account for 60 pct or more of the dollars allocated for European recovery.

Foods and relief need were taken care of first when ECA was set up, and in the beginning about 60 cents of each Marshall Plan dollar went for this purpose. By mid-November, the ratio had been reversed and the majority of allotments were for industrial goods.

"American manufacturers of machinery can expect continued growth of orders in both unit quantity and dollar value," Economic Cooperation Administration officials say.

With the ratio reversing, about half total allocations through 1948 went to industrial commodities. Of this, about $200 million represent purchase orders for machinery, including $20 million in agricultural types.

Authorizations made for delivery during the first half of 1949 already include more than $25 million in heavy machinery, $30 million in factory equipment, and more than $10 million in machine tools.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Iron and Steel Exports Gained During October

Washington

• • • **Iron and steel** exports rose sharply in volume during October to 326,918 net tons, according to the Commerce Dept. The increase of 35,154 tons over September exports is due principally to authorizations made by the Economic Cooperation Administration.

The total volume of iron and steel exports for the first 10 months of 1948 stands at 3,704,764 net tons. Tin plate and tagger's tin account for 506,940 net tons of this total, while nonfabricated plates account for 277,738 net tons.

West Coast . . .

ROBERT T. REINHARDT

• Steel users express diverse opinions on supply and price outlook . . . Columbia assures Utah fabricators of "consideration" but makes no tonnage commitments.

LOS ANGELES—In discussing steel supply, demand and prices for 1949 with some of the leaders in the industry here, it is interesting to note that several men have expressed opinions contrary to forecasts which prophesy that there will be no general reduction of steel prices next year.

While there has been some talk of steel demand slackening throughout the country this softening of the market has been spotty and market analysts refuse to accept this condition as indicating a trend. Local steel users report that any reduction in buying is slight and it is difficult to find any steel customer unwilling to accept quotas established by suppliers. In spite of reports that gray market steel is in less demand than some months ago, considerable tonnages of sheet and tubular goods continue to move above mill prices.

That there is no over-supply of tubular goods, for instance, is indicated by the fact that one large user of this material had not only placed an order at gray market prices for several carloads, but had also advanced a considerable sum of money as prepayment, only to be told at the time delivery was scheduled that the material was unavailable.

Looking ahead into 1949, Earl Grover, president of Apex Steel Corp., expects business to be brisk in the construction field for at least the next 6 months. The first 11 months of 1948 set a record for building permit totals of $802,014,130 which is already higher than the 1947 total.

"There was a definite drop in business close to election time," Mr. Grover said. "Building work has started to be heavy again, however, and I feel it will continue at least through the first half of 1949. Our estimators are crowded.

"Indications from other Pacific Coast steel men are that the same situation is true elsewhere. Prices went down some during the election and commercial and industrial work have spurted ahead during the last few weeks."

Mr. Grover expects little improvement in steel supplies and expresses "discouragement" at the increased prices of structural members. He is optimistic that foundry business will improve during the next few months and reports his own foundry operations as satisfactory. He said, "Foundries are more seasonal than many other businesses and work has slowed down recently. Supplies are low with many customers who are taking inventory, however, and I look for them to pick up the foundry business early next year." A drop in cupola cast prices was noted by Mr. Grover as being encouraging here as contributing to lower production cost and the opportunity to adjust selling prices.

Morris B. Pendleton, president of Plomb Tool Co., expressed two thoughts: "I believe steel will be easier to get because there will be a tapering off of requirements of many appliance companies who had planned heavy forward buying. This also would include many hard consumer goods and the appliances for which the demand has slumped recently.

"I believe business will continue good for those value products made of metal where prices have not gone up too much and where no substantial inflation has been shown."

MR. PENDLETON included in the latter category, hand tools where the prices are approximately 35 pct above prewar, which he termed "a minor cost of living rise." He said that in talks with buyers of metal products on the Pacific Coast he had found them keeping normal inventory on products on which prices have not gone up more than 35 or 40 pct above prewar prices, but they were keeping low stocks on items raised above this in anticipation of a drop in price.

Kenneth T. Norris, president of Norris Stamping & Mfg. Co., forecasts the softening of steel demand because of an anticipated drop in requests by appliance companies. He found no let up in the tightness of steel on an overall basis, however, believing that other demands would increase more than enough to take up any slack caused by a drop in appliance manufacture.

"As for business in general, I am proceeding with caution in my own plant," Mr. Norris said. "I think the business picture is uncertain although the high employment figures certainly are encouraging signs."

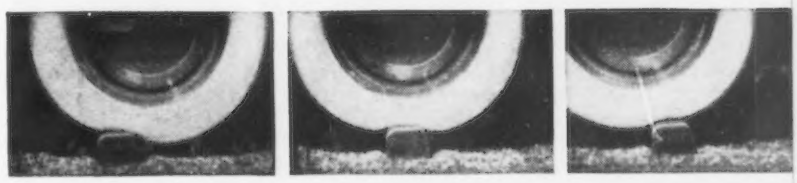
Henry J. Kaiser, is strongly of the opinion that steel demand throughout the West will steadily increase and foresees no possible decline as he pushes ahead a $17 million expansion program at his Fontana plant. Last week the first heat was poured from the new, seventh, 185-ton openhearth and ground has already been broken for the new 1200-ton blast furnace scheduled for completion before the end of 1949. Fabrication and erection contract is held by Consolidated Western Steel Corp.

Mr. Kaiser recently stated that he believed if steel were available national consumption would rise as high as 2 tons of steel per worker throughout the country.

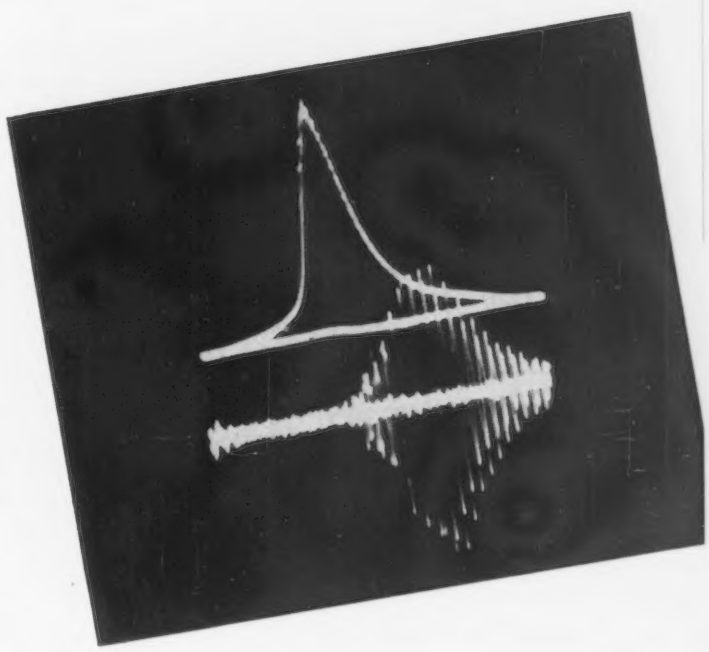
SALT LAKE CITY—A conference of intermountain steel fabricators and top officials of Columbia Steel Co. (sales agent for Geneva Steel Co.) produced some promises that an effort would be made to increase allocations in this

3 WAYS PHOTOGRAPHY STOPS TIME

1. HIGH SPEED STILLS—taken in as little as a millionth of a second—give you sharpest possible detail of a flash of fast action. They can be timed to catch the important instant of continuous motion. In the illustration, taken at 1/100,000 second, spray from a lacquer gun has been "stopped" to study dispersion of material.



2. HIGH SPEED MOVIES—slow down action far too fast to see otherwise—expand 1 second of operation into 4 minutes of viewing time. They allow the study of fast moving parts in operation—show why they stand up or fail. The illustration shows three frames of a high speed film made to study the action of a tire meeting an obstacle at high speed.



3. RECORDING OSCILLOGRAPH TRACES. When fast actions can be translated into electrical impulses, they can be traced on the oscillograph and photographed. In the illustration, the upper trace represents the pressure of detonation in the cylinder of a knocking gasoline engine—the vibrations in the lower trace have a period of about 1/100,000 second.

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FOG LIGHTS: *Westinghouse krypton flash lights are shown being installed atop the approach zone of the Landing Aids Experiment Station, Arcata, Calif. These lights are constructed on surplus steel landing mats and can produce flashes of 3 billion peak candlepower, yet each tubular lamp is a little larger than a cigarette. This installation is now undergoing tests and evaluation at the station along with numerous other visual and electronic aids to blind landing.*

area but no definite tonnage commitments were made.

The fabricators presented what they termed their minimum 1949 requirements at the closed meeting, but the best they could extract from Alden G. Roach, Columbia's new president, was an expression of sympathy for their position and a promise that a real effort would be made "to at least partially solve their problem."

Tonnage demand of the local fabricators was not made public but it would reportedly amount to 8 or 9 pct of Geneva's production. The fabricators are now getting somewhat less than half of that according to reliable sources.

Mr. Roach appealed to the clamoring steel users to recognize that the shortage is national; that everywhere in Columbia's territory the same situation exists; and that all facilities of the corporation are obligated to participate in satisfying the requirements arising from the military and voluntary allocations set up by the government.

"Sectional consideration alone," he commented after the session, would only lead to confusion."

But the local fabricators are still insisting that their location should give them a preferred status with respect to Geneva's production.

Columbia officials made it plain that they did feel a special obligation to take care of commitments which provided the base load for Geneva's operation at the time it was purchased by U. S. Steel Corp. One of the most important of these was from Consolidated Western Steel Corp., which has since been purchased by the corporation.

Dr. Walther Mathesius, president of Geneva, informed the fabricators that Consolidated's expansion into pipe fabrication was a major factor in getting Geneva into full operation.

•

Steel Goes Esthetic

Pasadena

• • • **A new,** but admittedly limited, market for steel has been developing here as more and more of that material is used in the construction of floats for the New Year's Day Tournament of Roses parade.

Scheduled for appearance Jan. 1 are a number of floats built on a network of steel to form a sturdy structure around which the curtains tures, some of which have as many as 400 different welds.

of flowers are hung. Formerly floats were built on trucks but as they become increasingly complex in design they require special struc-

One of the most novel to appear this year is a steel elephant which will cover a jeep and lead a circus parade as the entry for the Standard Oil Co. Kaiser Co., Inc., Iron & Steel Div., will be in the parade with a float depicting the progress in steel production in the West which will include replicas of the San Francisco Bay bridges.

•

WAA Offers Plant for Sale

Seattle

• • • **Subject to the** National Security Clause and to the terms of existing leases and commitments, the plant at Renton, Wash., operated by Boeing Airplane Co. during the war is being offered for sale or lease as a unit by the War Assets Administration through its regional Seattle office.

Bids are being invited and must be submitted not later than 11 o'clock a.m. Jan. 17 at the Seattle office. Heavy bombers were produced in this government-owned plant during the war which occupies approximately 84 acres and has 12 modern, readily-adaptable buildings, a 10-ton traveling crane system, elevators, public address system and other improvements. Easy access is provided to highway, rail and water transportation. Detailed information may be obtained from the Seattle regional office at 1301 Second Ave.

New Tractor Has Auto Tires; 4-Wheel Drive

Detroit

• • • **Using passenger** car tires and drive on all four wheels, a new tractor has recently been introduced by Detroit Tractor Corp.

According to Detroit tractor engineers, all-wheel-drive tractors have easy maneuverability and excellent operating economy.

The tractors are equipped with four-cylinder, 16 hp engines. The transmission is of the progressive type, utilizing alloy steel gears, heat-treated and shaved. The frame is welded steel construction. All wheels are chain-driven. The weight of the tractor is 1600 lb. Mechanical power takeoff and hydraulic pump and lift are available as extra equipment.

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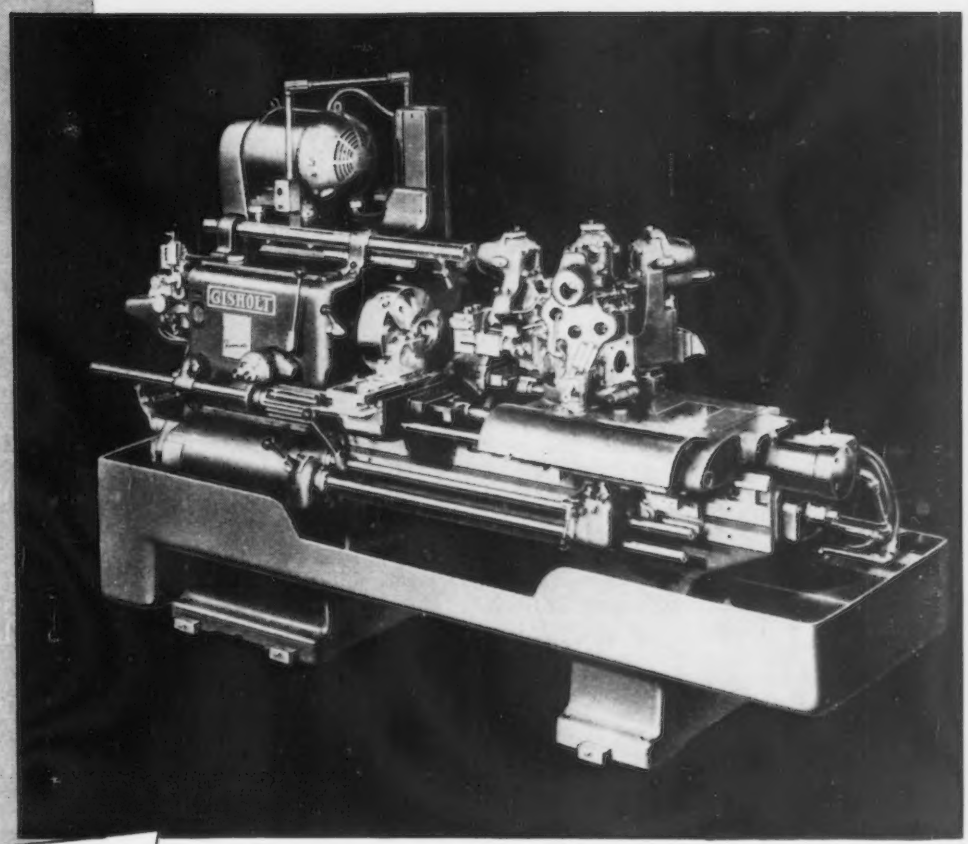

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PERSONALS

o o o

• **James W. Moran** has been elected president of Baker-Raulang Co., Cleveland, succeeding **E. J. Bartlett,** who became president emeritus, continuing as a director. Both Mr. Moran and Mr. Bartlett joined the company in 1911.

• **Albert Raphael** has been elected vice-president of the Bronx Iron & Metals Corp., New York, effective Jan. 1.

• **Ralph O. Smith** has been appointed president of the Wilkes-Barre Iron Mfg. Co., Wilkes-Barre, Pa. He formerly served as general sales manager of Vulcan Iron Works.

• **Robert Hutchinson** has been appointed application engineer in the central district of Kennametal, Inc., Latrobe, Pa., the headquqarters of which is the Cleveland office.

• **William G. Davis, Jr.,** has been named superintendent of production planning and **Gordon White,** assistant superintendent of production planning, for the Pittsburg, Calif., plant of Columbia Steel Co. Mr. Davis succeeds **Robert E. Williams,** who is returning to the company's general office in San Francisco to assume the duties of director of production planning for this U. S. Steel subsidiary.

• **Van M. Darsey,** president and director of the Parker Rust-Proof Co., Detroit, has been appointed to the board of directors of National Stamping Co., Detroit.

• **John L. Cook** has been elected president of the National Machine Products Co., Detroit, succeeding **Clare L. Brackett,** who died recently. Mr. Cook still retains the office of vice-president and director of the company.

• **Andrew D. Spruce** has been named Michigan representative of Circular Tool Co., Inc., Providence.

• **John D. Anderson** has been appointed assistant superintendent of the rod, wire and conduit departments at the Struthers, Ohio, plant of the Youngstown Sheet & Tube Co., Youngstown. Mr. Anderson joined the company in 1926 as an inspector in the galvanized sheet department.

• **William E. Massey,** now vice-president of the company, has also been appointed general manager, and **Joseph C. Smith** has been appointed sales manager, Weldit, Inc., Detroit. Mr. Massey has been with the organization since April, 1923. Mr. Smith has served the company in a sales and engineering capacity since 1936.

• **Bernard H. McGuiness** has been named vice-president in charge of the Robins Conveyors division, Hewitt-Robins, Inc., Passaic, N. J.

WALTER D. MONROE, JR., president, Chicago Steel Service Co.

• **Walter D. Monroe, Jr.,** has been elected president of Chicago Steel Service Co., of Chicago, succeeding his father, who died Nov. 30. Mr. Monroe has served as vice-president since 1937. **Donald F. Grace** has been designated vice-president in charge of sales. Mr. Grace has been with the company since 1925 and has served in an executive capacity since 1930.

• **William R. Dedert** has been appointed general superintendent, Victor Chemical Works, Chicago. **Homer B. Terry,** formerly superintendent of the Nashville, Tenn., plant, succeeds Mr. Dedert as superintendent at the Chicago Heights, Ill., plant. **John A. Coben,** previously general foreman at the Nashville plants, succeeds Mr. Terry as superintendent there.

• **Irving N. Simmons** has been appointed head of the patent division of the Houdry Process Corp., Philadelphia. Mr. Simmons has been associated with Houdry since 1931.

• **C. B. McGehee,** after a year's leave of absence, has returned to assume the responsibilities of his former position as general manager of sales, Truscon Steel Co., Youngstown.

• **A. M. Younger** has been made manager of southwestern sales for Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co., with his headquarters in Houston. Mr. Younger succeeds **L. G. Fox,** who has developed Wolverine operations in the southwest territory. Mr. Fox has returned to the company's Detroit office to assume special assignment duties. **J. L. Young, Jr.,** and **A. S. Williams** have been named to represent Wolverine throughout Texas, Oklahoma, Arkansas and Louisiana. Mr. Young has his headquarters in Houston and Mr. Williams in Dallas.

• **Paul C. McMillan** has been named manager of the newly-created San Francisco office of Monsanto Chemical Co.'s export sales department. Mr. McMillan has been located in the New York export sales office of the company.

• **J. Seton Gray** has been elected chairman; **E. L. Ludvigsen,** president, and **Harold E. Brey,** executive vice-president, Fuller Mfg. Co., Kalamazoo, Mich. **William E. Niness** has been named vice-president, sales, and **Thomas Backus,** vice-president, engineering. **Frank C. McManun** has been appointed manager of the transmission division and **E. L. Block,** manager of the unit drop forge division.

• **Robert H. Taylor** has been appointed president of the Florence Stove Co., Gardner, Mass., succeeding **Edward F. Dobson,** who died. Mr. Taylor joined the company in 1932 and has been vice-president in charge of sales and a director of the company.

• **John H. O'Connell** has been named public relations director of ATF, Inc., Elizabeth, N. J. Prior to joining ATF, Mr. O'Connell nad been associated with the Curtiss-Wright Corp. in various public relations and advertising executive capacities.

CHARLES D. EICHORN, sales representative, Berger Mfg. Div., Republic Steel Corp.

• **Charles D. Eichorn** has been appointed sales representative of the New York branch of Berger Mfg. Div., Republic Steel Corp., Cleveland. Mr. Eichorn became associated with Berger in 1947.

• **E. L. Carlotta** has been appointed research and development engineer for rubber products of the Parker Appliance Co., Cleveland. Mr. Carlotta joined Parker in 1941, and in 1945 was named superintendent of rubber production of the Parker special products division.

• **Mark Chisholm** has been named district sales manager of the newly-established sales office in Des Moines, Iowa, of the Syntron Co., Homer City, Pa. **Ernest K. Hood** is the new district sales manager of a new office in Kansas City, and **R. K. Bentzien** has been added to the Milwaukee sales office staff.

• **E. S. Wright** has been made manager of construction and **W. F. O'Neill** succeeds Mr. Wright as general superintendent of construction of the Chemical Plants Div., Blaw-Knox Co., Pittsburgh. Mr. Wright joined the organization in 1942. Mr. O'Neill has been with the division since 1941.

• **Neil Horgan** has been elected vice-president of the George A. Fuller Co., in charge of the New York office.

• **John F. Van Way** has been named midwest district sales manager in the St. Louis office of Byers Machine Co., Ravenna, Ohio. Prior to joining Byers, Mr. Van Way operated his own firm, Service Construction & Industrial Equipment Co.

• **Ruel T. Cadwell** has been named president, Holcroft & Co., Detroit. Mr. Cadwell has been active in the company since its incorporation and was formerly secretary-treasurer. **Charles T. Holcroft**, founder of the company and its president since 1917, remains with the company as secretary and consultant on furnace design. **Walter H. Holcroft** has been appointed executive vice-president; **C. H. Martin,** vice-president in charge of the Chicago office; **Robert H. Cadwell,** treasurer, and **A. W. Criger,** assistant secretary.

• **Dan J. Cantillon** has been appointed assistant manager of industrial sales of the Ferry Cap & Set Screw Co., Cleveland. **William H. North** has been named assistant to the president; **F. A. Schmiedt,** manager of office sales, and **F. A. Perko,** assistant controller.

• **Stephen W. Benedict** has been appointed director of research of the Master Builders Co., Cleveland. Mr. Benedict formerly served as assistant chief engineer of the cement reference laboratory and consultant on statistical problems in the division of mineral products of the National Bureau of Standards.

• **Norman C. Michels** has been appointed manager of operations of the Laclede-Christy Co., St. Louis, and its subsidiaries. Prior to his advancement, Mr. Michels served as chief engineer for the company. He came to Laclede-Christy Co. from the engineering staff of Carnegie-Illinois Steel Co.

• **Frank E. Early** has been appointed representative in the Detroit area for Askania Regulator Co., Chicago.

• **R. E. Madison,** who has been associated with the Truscon Laboratories in Detroit for 21 years, has been advanced to the position of technical director of the laboratories.

ROGER HUBBELL, district sales engineer, Threadwell Tap & Die Co.

• **Roger Hubbell** has been appointed district sales engineer for the Threadwell Tap & Die Co., Greenfield, Mass., covering the New England territory. Mr. Hubbell has his headquarters in Needham, Mass.

• **Joseph H. Quick,** vice-president in charge of operations, has been named executive vice-president of the Colonial Radio Corp., Buffalo. **George A. Godwin,** director of manufacturing, has been named vice-president in charge of operations. **Harry J. Kenworthy,** director of planning and procurement, has been appointed vice-president in charge of planning and procurement, and **Robert MacLatchie,** director of engineering, has been made vice-president in charge of engineering.

• **Elmer E. Sheldon** has been appointed staff assistant to the manager of manufacturing of the Construction Materials Dept., General Electric Co., Bridgeport, Conn. Mr. Sheldon joined the company in 1937 and formerly served as quality control engineer of the wire and cable division.

• **E. L. Frank** has formed an association with Philipp Bros., Inc., New York, as manager of the South American mineral and ore department. He had formerly been connected with W. R. Grace & Co.

W. A. REDPATH, plant manager, Joseph T. Ryerson & Son, Inc.

• **W. A. Redpath** has been appointed manager of the Philadelphia plant of Joseph T. Ryerson & Son, Inc., Chicago, succeeding **C. L. Hardy,** who has been elected assistant vice-president of the Ryerson organization with headquarters in Chicago.

• **Wallace E. Gordon** has been appointed assistant director of sales in charge of agricultural chemicals, adhesives, resale chemicals and zinc products in the Grasselli Chemicals Dept., E. I. duPont de Nemours & Co. Inc., Wilmington, Del., succeeding H. M. Rosencrans, who died. **Richard W. Thatcher,** formerly sales manager of the industrial preduct development and service section becomes sales manager of agricultural chemicals, succeeding Dr. Gordon. **Bertel C. Nylen** formerly manager of the agricultural product development section, becomes sales manager of the industrial develop-and service section succeeding Mr. Thatcher. **Charles J. Krister,** formerly marketing and field development supervisor, becomes manager of the agricultural product development section, succeeding Mr. Nylen. **Ernest R. Habicht** has been named as an assistant production manager of the ammonia department. **Fred A. Otto** has been promoted from assistant manager to manager and **John R. McConnell** from production superintendent to assistant manager, both of the Belle Works.

• **John A. Gallagher, Donald O. Schneider, William J. Halliday, Jack F. DeLancey,** and **Edwin A. Jonas** have been appointed sales representatives for the Billings & Spencer Co., Hartford. Mr. Gallagher, who had formerly been connected with Bingham Tool & Supply Co., covers Indiana, southern Ohio and Illinois, with his headquarters in Cincinnati. Mr. Schneider represents the company in Pittsburgh and northern Ohio, with headquarters in Cleveland. He formerly served the W. Bingham Co. Mr. Halliday has his headquarters in Collingswood, N. J., and covers Pennsylvania, Delaware, Maryland and part of New Jersey. Mr. DeLancey, with headquarters in Kansas City, covers Missouri, Kansas, Nebraska and western Iowa. He had formerly been associated with Ellfeldt Machinery & Supply Co. Mr. Jonas covers the Chicago territory, with his headquarters in the company's Chicago office.

• **F. J. Grant,** formerly Boston manager, has been appointed regional manager of the entire New England territory for A. Milne & Co., New York, effective Jan. 2.

• **Herbert E. Smith** has been elected chairman of the board and chief executive officer, succeeding **F. B. Davis, Jr.,** who is retiring, and **Harry E. Humphreys, Jr.** has been named president and chairman of the executive committee, U. S. Rubber Co., New York. **Arthur Surkamp** has been elected vice-president and chairman of the finance committee, filling the vacancy created by Mr. Humphreys' promotion. Mr. Surkamp has also been made a director and a member of the executive committee. **Herbert M. Kelton,** general auditor has been elected treasurer, succeeding Mr. Surkamp.

• **Morris E. Fonda** has been appointed publicity manager of Harry Ferguson, Inc., Detroit. Mr. Fonda comes to Ferguson from the National Association of Soil Conservation Districts. **Frederic A. Lyman** has been appointed product education manager for Ferguson. Mr. Lyman formerly served with Portland Cement Assn. and Fuller & Smith & Ross, Inc.

PHILIP H. CLAPP, JR., sales manager, Engineered Castings Div. American Brake Shoe Co.

• **Philip H. Clapp, Jr.,** has been appointed sales manager of the engineered castings division, American Brake Shoe Co., New York, with his headquarters in Rochester, N. Y. Mr. Clapp has been with Brake Shoe since 1946, and previous to his new appointment he served as sales representative.

OBITUARY...

• **Ralph B. Norton,** president and general manager, Norton Steel Co. Ltd., Montreal, died Nov. 26.

• **George F. Goddard,** 68, retired senior salesman, Carnegie-Illinois Steel Corp., Boston, died Dec. 16.

• **Chauncey P. Goss, Jr.,** 70, vice-president, Scovill Mfg. Co., Waterbury, Conn., died Dec. 19.

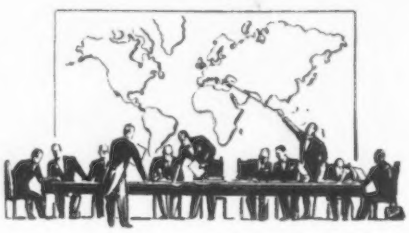
• **Howard E. Stoll,** 70, retired manager of rail sales, Bethlehem Steel Co., Bethlehem, died Dec. 14.

• **William F. Meister,** superintendent of construction, Pittsburgh Steamship Co., a U. S. Steel subsidiary, died Dec. 13.

• **Raymond W. Cook,** 58, executive vice-president, Associated Spring Corp., Bristol, Conn., died Dec. 4.

European Letter . . .

• Further American monetary aid and effort must await more acceptable Chinese government . . . Theory that China still ranks among great powers little protection against disintegration and outside pressure.



LONDON—The enlightened self-interest which is supposed to be the basis of American foreign policy is tempered, according to the area in which it operates, by certain popular beliefs and prejudices. Where Europe is concerned, there has existed, until the last two years, a fear that the greater experience and cunning of European diplomats would always prevail against the simpler and more honest methods of American negotiators. In a hundred years of American policy towards China the tempering agency has been sentimentality. It is as hard for a foreigner to understand the American ability to forgive Chinese peccadilloes as it is for the rest of the world to understand the continuing British preoccupation with the Arab countries in the face of insults and betrayals. The American equivalents of such exotica as T. E. Lawrence or Glubb Pasha are the flying General Chennault and a small band of missionaries or sons of missionaries. In the second group Representative Walter Judd, a former missionary, and Henry Luce, born in China of missionary parents, preach the interests of China regardless of the merits of the regime in power.

If, as now seems apparent, Mr. Marshall has lost hope that the present Chinese Government can govern and President Truman has lost patience, it does not follow that the American people have lost either. Should a new alternative to the Generalissimo appear, or Russia's ambitions cover themselves with even the thinnest veil, the present coolness would disappear, the long wait for Chinese rehabilitation would be resumed, and America would again pick up the bills and pay for the waiting time.

THE illusion, after so many disappointments, that rehabilitation is still possible is compounded of many factors. From 1784, when a small merchantman bearing the grandiose name *Empress of China* slipped out of New York Harbor with a cargo for Canton, to last June, when the wheat ships sailed, American interest in China has been far greater than cold reason can measure. An early desire to beat England at her own game, the memory of clipper ship records, the missionary spirit, the businessman's dream of winning four hundred and fifty million customers, a sense of national virtue dating from the Boxer Rebellion—all these play their part. To them should be added the perennial American belief that any people who admire the American form of government should be helped to emulate it. Chiang Kai-shek owes more to Sun Yat-sen than it is convenient to admit. Writers from Bret Harte to Pearl Buck have done their share in giving China a good press in the United States. A flood of admiration for Chinese patience, Chinese courage, Chinese endurance stands ready to be turned on at will by almost any ambassador. That it should be withheld from Madame Chiang Kai-shek at this juncture, remembering its sticky abundance on her former trip, is the surest measure of China's present plight.

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The China cult still draws color from the days when the captains of clipper ships set up records for the China run from Salem or San Francisco that only the airplane can make seem slow. China was then a mine of varied riches which could be bought cheap and sold dear. A single run brought huge profits, and left a sediment of silk, teak and ivory in American seaport towns that still plays its part in handing on the tradition. The "Opium War" between China and England enlisted American sympathy on the Chinese side. The importation into California of Chinese cheap labor to help build the western railroads, and the appearance of Chinese gold hunters in mining towns added economic bitterness, and the Chinese Exclusion Act a slight tinge of guilt, to the romantic brew. Charity and religion went into it, spread by missionaries who reached deep into prairie towns and mountain villages for the barrels of clothes and boxes of hoarded pennies with which Chinese heathen were to be clothed, fed and converted. Little boys fingered souvenir opium pipes, little girls shivered at tales of bound feet and drowned girl babies.

THE Boxer Rebellion, which followed hard on the famous policy of the "Open Door," crystallized this complex of attitudes into its present form. There, for the first time, American troops on foreign soil measured their behavior against that of European allies; they emerged with admiration for the Chinese enemy. When an indemnity was levied on China for having failed to keep her rebels in hand, the United States remitted $18 million out of its $25 million share, on condition that the money be used to send Chinese students to American schools and colleges. They are still coming. Like many a benevolent relative, Uncle Sam gave his heart with his money, and is to this day paying interest on that gesture.

The "Open Door" policy, a phrase still used to describe the official attitude towards China, dates from 1899 when John Hay, then Secretary of State, brought it into being after vigorous British urging. It was a demand that the powers then staking out spheres of influence in China declare their intention not to inter-

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fere with the Treaty Ports and not to discriminate in favor of their own nationals. In the words of America's diplomatic historian, Thomas Bailey, the Hay communication was "like asking all persons in a room who were not thieves to stand up." The bluff worked, and England, Russia, Japan, France and Italy were declared by Mr. Hay to have signed the assurances desired.

The first American treaty with China (the treaty of Whanghai signed in 1844) had given all powers equal precedence before the great wall of Chinese isolation; this second "Open Door" treaty gave them equal rights to enter the doors which the existence of Treaty Ports had made in the wall. The Nine-Power Treaty signed at the Washington Conference in 1922 marked the next step — an agreement not to cut any more doors in a wall which by this time had been flattened in many places. Specifically, the powers agreed to respect the sovereignty, the independence and the territorial and administrative integrity of China and to help and encourage the development of stable government, and to refrain from taking advantage of conditions in China to seek special rights and privileges. The fourth stage, the 1943 treaty, was an agreement to recognize the open doors and the flattened walls (not to mention the exhausted spheres of influence), by abolishing the principle of extra-territoriality.

Official figures of what the China cult has cost the United States in the last decade are incomplete and vary with the agency that issues them. An unofficial source estimates that the U. S. government has spent $3.6 billion in aid to Chiang Kai-Shek's government since the start of the war. Another puts the cost to American taxpayers as upwards of $4 billion since 1937. The most recent grant was the $463 million authorized by Congress last April to be spent for military and economic assistance before April, 1949.

FRIENDS of China never weary of pointing out that compared to expenditures in Europe these sums are small. Meanwhile it is worth noting that American investments in China are rather less than one might assume from the heat which they sometimes generate. In 1930, commercial investments were estimated at $197 million while religious, educational and benevolent organizations valued their properties at about $41 million. In 1943, American assets in China reported to the Treasury were valued at $122 million; included were $47 million belonging to non-profit-making organizations. As for trade, the 1931-35 average showed exports to China to the value of $66 million and imports to the value of $8,000,000. In 1945, the exports totaled $92 million, while imports had fallen to $6,023,000.

Obviously in casting up any such account the intangible factors weigh heavily. When this long tale of friendliness began, China was a great power and the United States a very small one living more by its wits than by demonstrable strength. Theoretically China still ranks as a great power, but the theory is little protection against internal disintegration or external pressure. The face-saving intent of the 1943 treaty, the repeal of the Chinese Exclusion Act two months later, the repeated loans and grants have only served to emphasize the reversal of positions that has taken place between the two countries.

THE "Open Door" is now in China's keeping, but there is some doubt as to which way it opens. Since Mr. Marshall's return from China and the publication of his disillusioned report on his months of unsuccessful effort to fulfill the President's instructions, there has been a determined attempt on the part of the Administration to divorce itself from the present Chinese government. This attempt would have been successful had not the small and determined minority of Sinophiles inside and outside Congress forced a program of aid to China totaling $463 million into the Foreign Assistance Act of 1948. This program was not large enough to have much effect on this year's campaign against the Communists, but it strengthened Asia's belief that American prestige was bound up with that of the Chinese government. Chiang Kai-shek's disaster has become partly America's disaster.

That this should have happened is unfair to the State Department and to Mr. Truman, whose decision that the Kuomintang was no longer worth America's continued support has now been justified. The Chinese Ambassador is believed to have proposed that $3 billion be given to China in the next three years and that an outstanding American military leader should go to China. But both the President and Mr. Marshall have been firm in their refusal to be rushed into further large expenditures of effort and seem to have decided to wait until some successor to Chiang Kai-shek appears. When and if that happens the traditional American friendliness will reassert itself. Mr. Hoffman, the Economic Cooperation Administrator, who has flown to China, has suggested that further American aid might be granted to a coalition between the Nationalists and Communists provided it did not in fact merely cloak Communist domination, did not suppress religious and political freedoms, and fairly represented the Chinese people — a tall order and one which the State Department considers to be too hypothetical to be worth consideration at the moment.

HAD the Republicans won the election the present policy would have been reversed and China would have become the recipient of large grants of military and economic aid. If the recent disasters had taken place before November 2, Mr. Truman would have had to weaken in his determination not to try any longer to shore up the present regime and would have had to make promises to match Mr. Dewey's. As it is, there is no likelihood of Mr. Marshall recommending even token aid to the token resistance of the Nationalist forces. He is accused of undermining Chiang Kai-shek's position by his refusal to promise help. In fact, by his silence he is giving him all the help within his power, for if all the information available in Washington on the exploits of the Nationalist government were published the effect would be fatal. By her ill-timed mission (undertaken, it is understood, on the advice of William Bullitt) Madame Chiang Kai-shek has done her husband no good. The melodrama of her flight, followed by the unconcealed frigidity of her welcome, have advertised his plight but will do nothing to ameliorate it.

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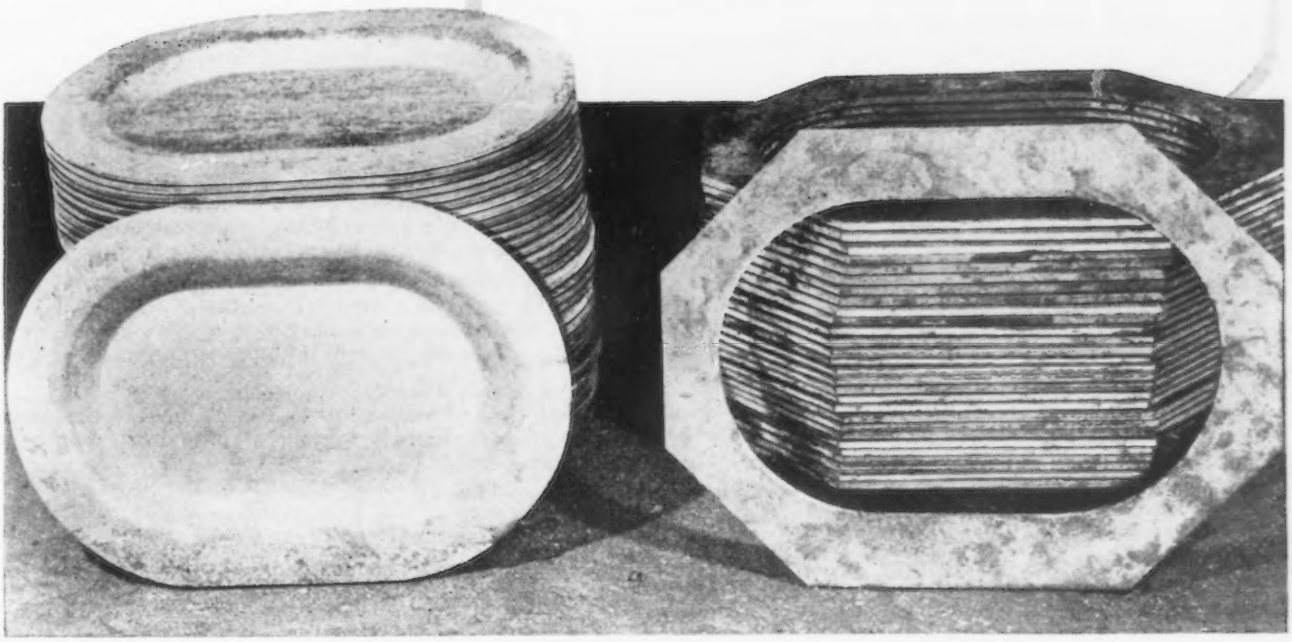

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MARKET BRIEFS

• **PIG IRON EASES**—Pig iron shipments in the Chicago area picked up in December. With all merchant furnaces on, the sellers increased their shipments considerably. A few foundries received twice as much tonnage this month, over November. Another factor which has served to ease supply is the general falling off of foundry business. Pig iron users predict that supplies in January will be even better. Sellers prefer to remain noncommital. Inland Steel Co., which was slated to pull off a blast furnace for relining late in December, has postponed this job. They are squeezing for every ton in order to fulfill their merchant iron commitments before the furnace must be taken off.

• **HIGH STRENGTH PRICE UP**—The base price of Yoloy, Youngstown Sheet & Tube Co.'s high strength, low alloy steel has been advanced by $4 a ton across the board. Yoloy contains about 2 pct nickel. Rising costs of nickel and nickel scrap had not previously been reflected in the product's price, a company spokesman said. Jones & Laughlin's Otiscoloy and National Steel's N-A-X don't contain nickel. Other steel companies' high strength, low alloy steels contain up to 1 pct nickel.

• **HANDY REFERENCE**—The Iron and Steel Div. of the Office of Industry Cooperation, Dept. of Commerce has prepared specially for THE IRON AGE a handy reference table of the monthly steel requirements for voluntary allocation programs now in existence and those planned to be extended. The table appears on p. 75 of this issue.

• **GEARS DIP**—Volume for the gearing industry was decreased by 7.29 pct in November compared with October. The new index figure is 309 (based on 1935-39 = 100).

• **U. S. STEEL SUPPLY TAKES OVER**—Carnegie Illinois Steel Co. has turned the concrete bar fabricating business to its sister subsidiary **U. S. Steel Supply.** This company is setting up to fabricate, engineer and completely handle this end of the business. Fabricating will be done in Chicago, Cleveland, Pittsburgh and Boston.

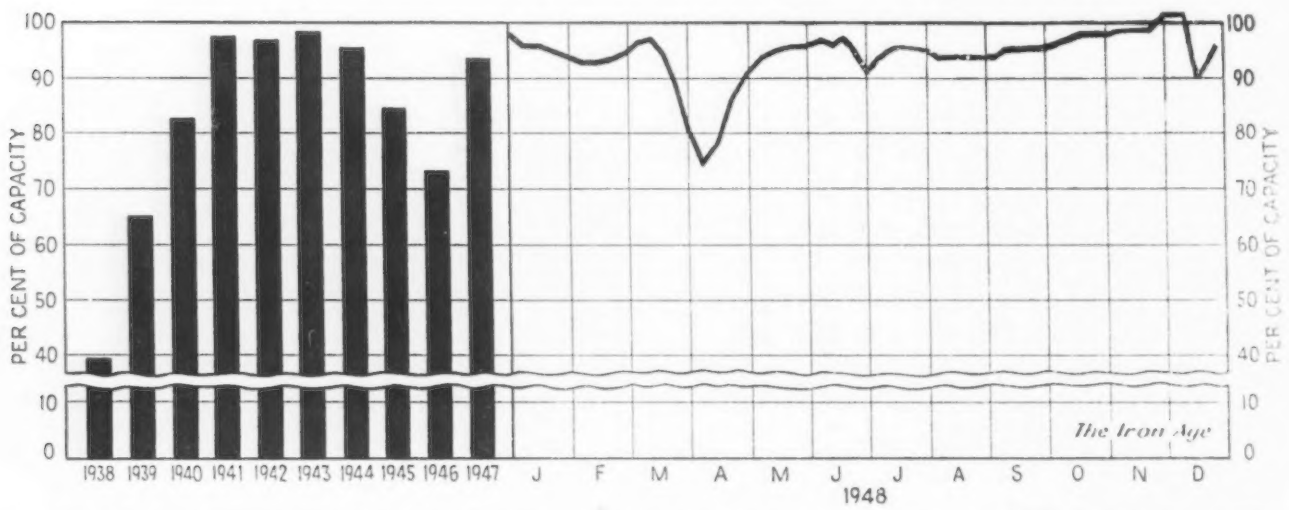
• **CONSTRUCTION STEEL**—A total of 2068 bridges are under construction in the United States, according to N. R. Patterson, president of the American Institute of Steel Construction. This is the largest number of new steel bridge jobs in a decade the institute found out through a survey made by its 15 district offices. During the past year, steel used for bridge construction ran about 1.9 million tons. With additional allocations slated for 1949, the institute feels that steel put into fabrication may fall some 10 pct this year. The industry has facilities to fabricate about 2 million tons of steel a year with backlogs of contracts for the first 6 months exceeding 1 million tons. Demand is still generally strong and there is some evidence that the end of the spiral of building costs has been reached.

• **CRUCIBLE SELLS**—Crucible Steel Co. of America has confirmed that melting facilities at the company's Park Works, Pittsburgh, were sold to Deere & Co. of Moline, Ill. last week. Negotiations for the sale had been reported in **The Iron Age**, Dec. 23, p. 98. The sale does not include any of crucible's finishing facilities. Nor does it affect Crucible's melting shop at Midland, Pa. Deere & Co. is expected to convert the ingots from its new facilities for use in manufacturing farm implements.

• **UP TIN PLATE**—Granite City Steel Co. will advance the price of tin plate effective Jan. 1. Hot dipped tin plate will be increased 95¢ to $7.95 per base box for 1½ lb coating. The 1¼ lb coating sheets will be increased 90¢ which will make this item $7.70 per base box of 100 lb. All wire enameling black plate 29 to 31 gage is increased $11.00 a ton. The new price is now $5.50 per 100 lb.

• **NEW CAN PLANT**—The much discussed Continental Can Co. Pittsburgh plant will be started in the spring on a 40-acre site in West Mifflin Borough near Irvin Works of Carnegie-Illinois. The railroad siding is being built now. The 700,000 sq ft building contract has been let to Wigton-Abbott Corp., Plainfield, N. J. The plant will manufacture cans and crown caps, to some extent replacing present facilities in other locations in the Pittsburgh area.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
December 21	83.5	87.0	62.0	93.0	93.0	105.0	89.0	100.0	88.0*	104.0	107.0	89.5	90.0	90.0
December 28	*6.5	99.0	93.5	93.0	97.0	105.0	98.0	102.0	102.0	100.0	110.0	80.0	98.0	98.0

* Revised.

Industrial News Summary—

- **Some Steel People Are Pessimistic**
- **But No Sign of Crackup Is Seen**
- **U. S. Steel Finds Big Ore Strike**

WHILE government people and congressmen worry about the lack of steel capacity, steel makers are beginning to turn a little pessimistic on the outlook for 1949. But their pessimism is relative. It may be the inventory season. Or the soft spots in some consumer lines using steel. Or it may be the realization that bubbles cannot last forever.

Behind the year end gloom (which to users of steel means a more normal way of doing business) there is no reason to expect a sudden drop in steel output. Nor is there any real basis for being pessimistic about the immediate or the short term future of the steel industry. Steel sales people will now have to brush up on lessons taught so long ago that many of them are forgotten. Steel is a commodity that generally has to be sold.

For the past 3 peacetime years steel demand has outrun supply to such an extent that selling was no problem. It won't be a problem for many months. But some time in 1949 pressure will be off, steel orders will resume a trend where they mean something, gray markets will be a thing of the past and conversion deals will be used only to take care of an extra load that must be gotten out.

Just as steel people look for less hair raising pressure from steel users by next year, the price outlook for some raw materials used in steel making is brighter. This week there have been no major changes in scrap prices. But that does not mean there won't be some soon. Quality of scrap has been much better in recent weeks. This means that scrap is cheaper because better quality has meant more tons of steel per ton of scrap.

HIGH steelmaking costs are receiving some relief from better scrap and in some areas lower quotations on No. 2 heavy melting. Support has also come from lower fuel oil prices, a big item in steelmaking these days. But steel heads argue that these slight windfalls in the costs of making steel were needed to offset other costs which are still on their way up, or are at peak levels.

Another item—labor shortages—which had been worrying steel people in the Midwest, is no longer an acute problem. Some companies which had trouble filling vacant jobs find plenty of new faces asking for employment. This has led to some anxiety because they may have come from steel consumer plants. If the line of men looking for work at steel mills grows too big it will mean less steel is being chewed up. This would lead to more pessimism in top level thinking. But it is far too early to assume that the steel industry has reached the point where the buyers are in complete control of the market.

The iron ore puzzle in the United States is falling into place. The biggest chunk to fit into the future pattern is the U. S. Steel Corp.'s big discovery in Eastern Venezuela. That firm has been exploring in that locality for the past several years. It has found an ace in the hole to take care of supplemental ore needs in years to come. The ore discovered is high grade hematite running from 62 to 69 pct iron content.

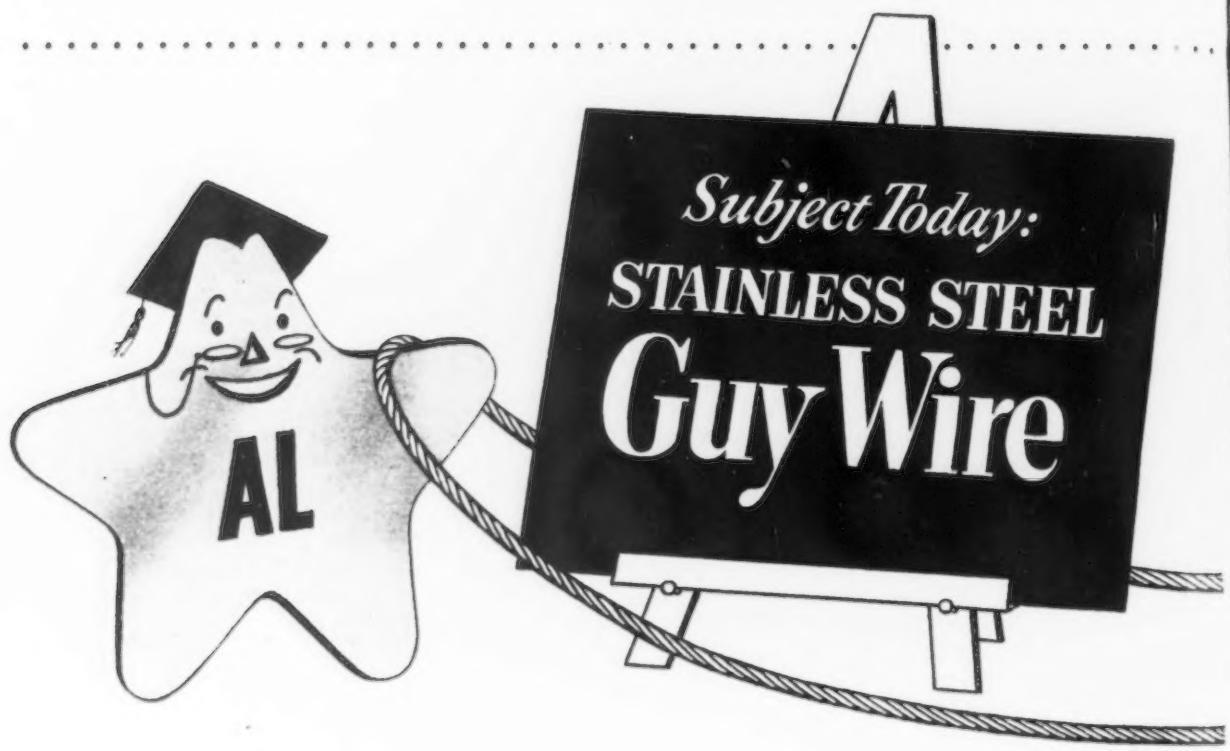
Not only is the quality excellent but the amount already proven by U. S. Steel is vast—running into several hundred million tons of high grade ore. At present Steel Corp. heads do not know (1) how much more will be found (2) when the ore will be mined and shipped to plants in this country or (3) whether the annual shipments will run 2 or 10 million tons. Future events will answer these questions.

BUT they do know that: (1) The ore is there. (2) It will be used eventually. (3) It is the biggest strike since the Quebec-Labrador discovery was made public. (4) Costs of delivering to the point of consumption will determine when and how much ore will be brought in. (5) It will supplement high grade Mesabi fields and stretch their life line. (6) It will compete with beneficiated taconites which are expected to be the keystone of future Lake steel plant ore requirements in the United States after experimental work is completed.

In the future picture of ore demand from Eastern and Midwestern steel mills there is room for (1) concentrated low grade ores from Mesabi and Adirondacks (2) ore from Canada especially Quebec-Labrador fields (3) ore from Venezuela where two firms now are located and (4) ore from Brazil, when and if that government makes it possible for its ore to compete by making delivery costs low enough.

This week the steel operating rate is 98 pct, up 8 points from last week. Next week the industry is expected to again approach or reach 100 pct of rated capacity as mills return to normal schedules.

Economics of ALLEGHENY METAL



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U. S. Steel Has Proven Huge Iron Ore Deposit in Venezuela

South American and Canadian Ores May Augment Domestic Open Pit and Taconite

By TOM CAMPBELL
News-Markets Editor

New York

• • • **Benjamin** Franklin Fairless has one more major ambition to attain before he retires as chief executive officer of the U. S. Steel Corp. He wants to be able to provide sufficient iron ore to protect his company's investments for the next 50 to 100 years.

It looks as if Mr. Fairless will reach his latest goal—maybe faster than was thought at first. Today the U. S. Steel Corp. has definitely proven several hundred million tons of high grade ore in Eastern Venezuela. It will run from 62 pct to as much as 69 pct iron. Most of it is hematite.

Coenthusiast in this major venture of U. S. Steel is John G. Munson, raw material chief for the corporation. Ore for the next 50 to 100 years has been one of his worries for a long time. Now his worries will only be the headaches that come with brand new ventures. Modern machinery and engineering keep these troubles down compared to what was faced in similar conditions many years ago.

In addition to exploration, actual drilling has been going on for some time. The Oliver Mining Co., subsidiary of U. S. Steel, has been the Johnny-on-the-spot. A large part of the tremendous iron ore deposits, which will swell to a greater figure as more drillings are made, is virtually a mountain of ore—Cerro Bolivar.

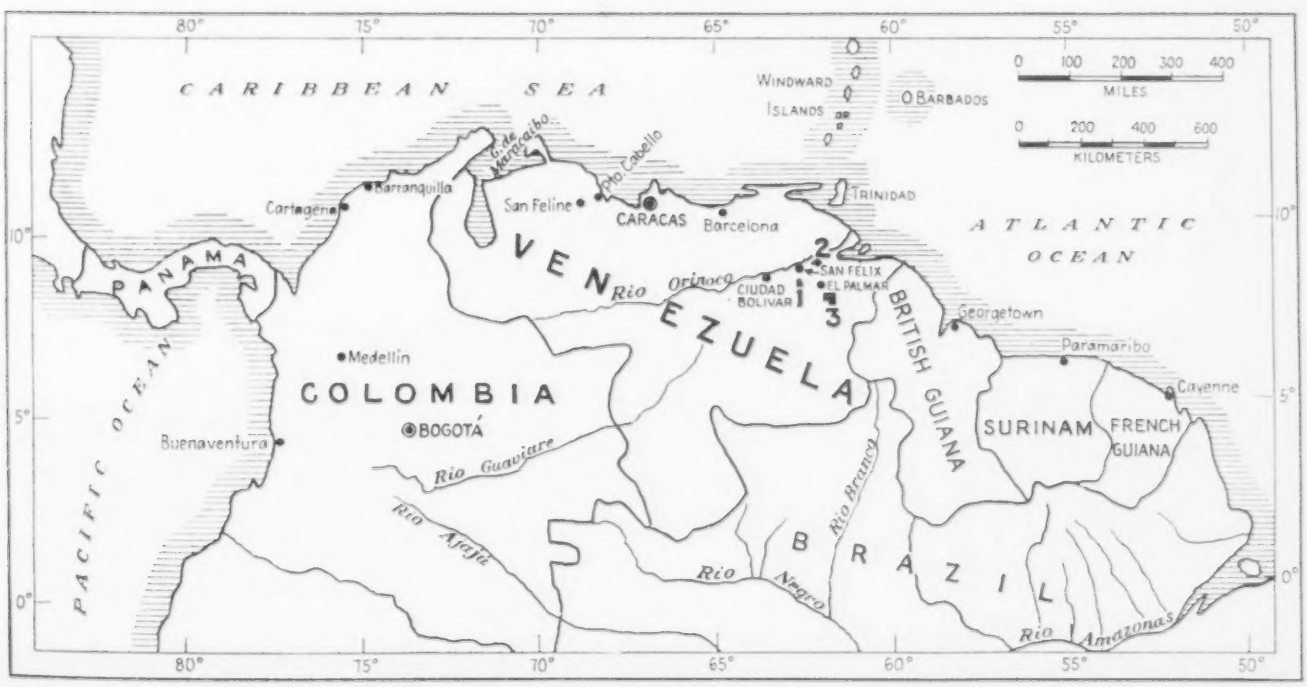
No one knows at this time when the ore will be taken out. Much has to be done. The places where the exploration has been going on are not far—as miles go—from the Bethlehem projects at El Pao and Piacao. El Pao is about 36 miles from the Orinoco River.

U. S. Steel's ore concessions are in deep jungle territory in the state of Bolivar. Much of this country is little known. Until recently there were many places where no man had set foot. In addition to the mountain—Cerro Bolivar—U. S. Steel concessions include La Grulla. The whole area is directly south of Barrancas and not far from El Palmar. This looks easy on paper but actually there are still many unknowns in the picture.

U. S. Steel people do not know whether, when ore is moving, there will be 2 million tons a year shipped or 10 million tons. That is still a tough problem. If they should decide that the answer is 2 million and provide facilities to ship that much, well and good. But if they decide on 2 or 3 million tons and the situation much later supports a 10 million ton year, then hind sight would mean that facilities for that amount should have been built in the first place. But it would be just as bad if they provided for 10 million and only shipped 2 or 3 million tons.

Facilities mean barges, railroads, ore cars, ore vessels, docks, bridges, dredging equipment, mining machinery and hundreds of other things—not the least of

U. S. STEEL'S ACE: *In years to come high grade iron ore from Venezuela will supplement beneficiated taconites, high grade mesabi ore, Quebec-Labrador ore and ore from other fields. On the map are Bethlehem's* (1) *El Pao and* (2) *Picacao. The big strike of U. S. Steel is in the area marked* (3). *Ore there runs from 62 pct to 69 pct iron. Cerro Bolivar is the prize ore mountain.*



What's the Score in Iron Ore

New York

• • • A few years ago the steel industry clearly realized that the great Mesabi ores, open pit and cheaply mined, would not last forever. Two world wars had cut away at this foundation of the American steel industry.

But geologists, mining engineers and steel people had been quietly looking around. They explored. They figured. They imagineered. While they did this, reports were circulated that the high grade open pit ores would be all used up in 10 or 15 years. Others said this was not so; that we had many, many years to go.

What was or what is the truth? It is somewhere between what the optimists and the pessimists say. The nub of the matter came from Charles M. White forthright head of Republic steel when he talked about iron ore before the American Iron & Steel Institute on Mar. 17, 1947. His talk is still used as the last word on the iron ore situation. At that time he said:

"It makes small difference whether the shortage comes in 5 years, 10 years or even longer. The point is that in a distressingly short period of years Minnesota open pit ores will be available in insufficient quantity, with all that other mines of the Lake Superior can produce to supply the needs of the steel industry dependent on Lake ore."

What Mr. White said 2 years ago applies today. New discoveries and the better outlook for others make the picture a little brighter. But these new deposits must compete with each other. In turn they must compete with beneficiated taconites which will be the future foundation in the Lake areas. Cost of delivery to the point of consumption will be the yardstick. Each body of ores in the future will complement the other and stretch to a much greater length the life span of high-grade open-pit Mesabi ores.

which would be the wherewithal to support whole towns of workers and their families. So the problem of when and how much ore is extremely complex. U. S. Steel deals in decades like some people deal in years. But these puzzles will be settled over the next several years.

The U. S. Steel concessions, to be exploited, will require a railroad of about 100 miles. Plenty of back breaking work will be necessary long before any ore goes down to the Orinoco and then to the Gulf of Paria. And money! Plenty of that will be needed. But (as in Quebec-Labrador) the ore is there, it will be needed and it will be mined and brought to some of the corporation's plants.

Before towns are built and ore is mined, miles of road must be cut through jungles. Only those who have been down that way, or those who have seen what tremendous problems face the backers of Quebec-Labrador can have an idea of what has to be done. The railroad will be built over relatively flat land. But the main job later will be to build loading docks at the Orinoco with provisions made for the 40 ft changes in the river due to seasonal and tide factors.

Ore will be barged down to Orinoco to the gulf and then transferred to sea going ore carriers by moving belts. The same setup is to be used next year by Bethlehem when it gets its first load of ore out of Venezuela some time in the latter half of 1949.

In the next 5 to 10 years or when ore starts coming to U. S. Steel plants, probably TC&I and Pittsburgh and maybe an Eastern works, it will not be the answer to all ore requirements at those locations.

Mr. Fairless likes to see the various ore discoveries and developments as eggs in a basket—but not all in one basket. Neither he nor his men have written off the importance of the Quebec-Labrador discoveries. They could at some future date participate there. Nor do they discount Brazil. In that country there is more ore than can be imagined. But the cost of delivering it will be the yardstick which will decide, how much, if at all, and when Brazilian ore will be imported to the United States in large quantities. Small quantities are coming in now for use in openhearths.

Above all, people like Mr. Fairless, Charles M. White and Don Gillies of Republic, and George Humphrey of M. A. Hanna see the low grade Mesabi ores (taconites) as a main stay in the United States for years to come. Pilot mills working on beneficiation of these ores will have the answer in a few years—it cannot be otherwise because they have to find the answer. And they must cut the costs, or keep them down.

U. S. Steel has no basic ore favorites. While its people look on Venezuela with much favor, success there depends on net cost at the furnace which will consume the material. South American governments must see that they have something to sell that is needed in North America. If the price is too high the amount of ore brought in will be less.

The same thing applies to Canada's new discoveries. They will cost a lot to develop. But they will be used. And they will be sharply competitive with South American ores — and taconites. There are intangibles in South America which favor use of those ores as a complement to the taconites and high grade Mesabi ores.

But there are also intangibles in the Quebec-Labrador fields. They will offset some of the South American advantages. Heavy costs in Canada will be involved in the 350 mile railroad and the 5 to 6 month season at the ore beds. But at the same time it can be remembered that South American labor is not as efficient as North American labor.

Also in South America there are jungles, rains, revolutions, plugged up deltas and if there were to be a war—a lot of open sea to travel before the United States is reached. So from an objective standpoint there will be plenty of competition between Canada and South America in years to come. That is what North American steel people want. That is what will make these ores fit into the United States ore puzzle—a puzzle that is rapidly being pieced together in an orderly fashion.

Certainly the Lake area plants of U. S. Steel will, in the not distant future, use beneficiated taconites from Mesabi—plus high grade open pit material. Both of these may be supplemented with Canadian or South American ores or both. And there is no reason to believe that U. S. Steel will have Venezuela to itself—nor does it want it that way. Bethlehem is already there. Other companies will eventually participate. The same goes for Brazil. Iron ore may be the bond which in years to come will bind North and South America closer together than ever before.

German Dismantling Tangle Persists But Recommendations Call for More Steel

New York

• • • **To dismantle** or not to dismantle is still the question in the Bizone of Germany. England and France are both still strong for dismantling. But for different reasons. England's are commercial. France's are governed by security.

Uncle Sam apparently has no idea what he wants. That's why two or three commissions have been sent to Germany on the dismantling problem. What the last one found bore out the report of the first. American taxpayers will get relief only if Germany is permitted to make steel and other items.

Latest recommendations call for a 10 million ton product year for steel in the Bizone. This is more than either England or France has been willing to agree to. The reasoning is that if exports are to flow from Germany in sufficient quantities to strengthen the currency, something must be done. Something that is clear cut, definite and forthright.

People who have reason to know, from being on the scene, say that output of steel at the rate of 10 million tons annually would do two things. First, it would mean 1¼ million tons of steel products—not ingots—could be directly exported. Second, it would mean 1 million tons of steel products would find their way indirectly into export in the form of autos, refrigerators, etc.

Such a program, these people say, would mean a net of $500 million in terms of hard dollars. It is argued that if that came to pass it would be a catalyst to $500 million more of credit that means something.

As things go today the German manufacturer has no faith in the mark. He sees no clear-cut agreement. He sees plants dismantled no matter what they make. They have become only numbers or designations. Under present conditions he has little incentive to pick up his dragging feet and try to make a fresh start toward self help.

At present American taxpayers are footing a bill in Germany that runs as high as $1¼ billion annually. That doesn't include the airlift, which is said to cost as much as $1 million a day. Whether or not the U. S. Government will get anywhere with the dismantling tangle remains to be seen. Enough sitting on the subject has been done to suggest that a few more months will roll by before a clear-cut plan evolves—if the government finds out what it wants.

Industry Files Appeal In Rigid Conduit Case

Washington

• • • **A Supreme Court** ruling in the rigid conduit industry basing point case was sought last week when the industry filed an appeal against the decision of the 7th Circuit Court.

The lower court had upheld charges by the Federal Trade Commission that 12 manufacturers and sellers of rigid steel conduit were engaged in "unfair methods of competition" under Section 5 of the FTC Act through the use of basing points.

The main question before the high court is whether independent use of a basing point system does constitute unfair constitution when there has been no finding of either conspiracy or price discrimination.

Pittsburgh Firm Gets Two Export Mill Orders

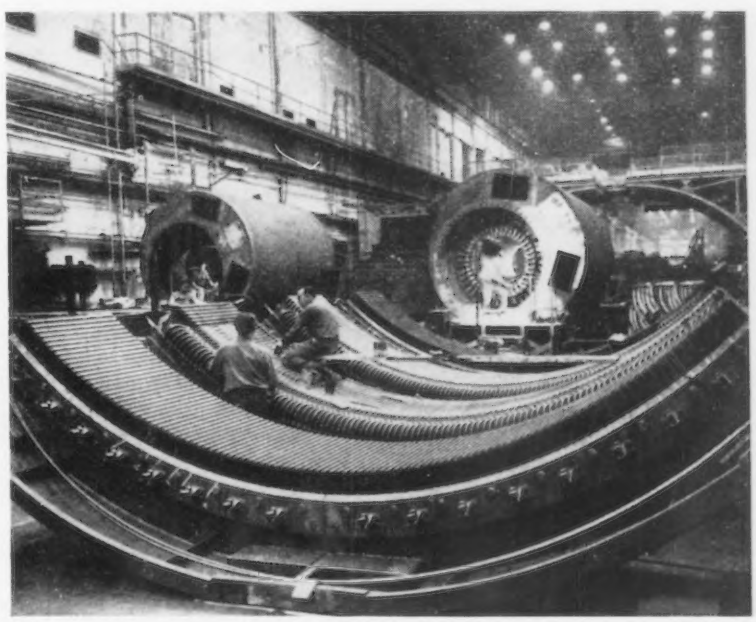
Pittsburgh

• • • **Two orders** for rolling mills for export have recently been booked by Lewis Foundry & Machine Div., Blaw-Knox Co. One is for a rod mill to be located at Pretoria, Union of South Africa. The other is from the Argentine Government for a nonferrous mill at Buenos Aires.

The rod mill contract, with the South African Iron & Steel Industrial Corp., is for engineering and construction of a 4000 FPM 29-stand mill to roll No. 5 wire rod. (No. 5 rod is nominally 0.218 in. diam., the smallest size a rolling mill can produce in practice.) It includes furnace pushers, transfer tables, flying shear, etc.

The Argentine order includes a 2-high 48-in. hot and cold reversing mill and a larger 48-in. reversing cold mill, both to roll aluminum, brass and copper.

POWER GENERATOR: *These 4 sections of a large ring form the stator of a waterwheel generator. Each section weighs more than 43,000 lb. The entire generator will weigh 860,000 lb and produce 28,000 kw of electric power. Westinghouse workmen are shown fitting the coils into the metal sections which when assembled will serve the needs of 56,000 homes.*



Industrial Briefs . . .

• ANNIVERSARY — The H. K. Ferguson Co., industrial engineers and builders, will mark its thirtieth anniversary this year by distributing $275,000, the largest bonus in its history, to approximately 950 employees engaged on engineering and construction operations throughout the United States and in several foreign countries.

• MORE OXYGEN — Early in January the Burdett Oxygen Co. of Cleveland will put into operation its new oxygen producing unit costing over $150,000. Here, new methods utilizing oxygen on furnaces, is enabling mills to produce 33 1/3 pct more steel with the same facilities.

• OPENS SALES OFFICE — A. Milne & Co., New York, has announced the opening of a sales office in Springfield, Mass., at 1387 Main St., under the direction of Andrew Clark.

• CHANGES NAME—Penn Rivet & Machine Co., Hatboro, Pa., formerly Penn Rivet Corp., has announced the change of its corporate name to the Milford Rivet & Machine Co., Penn Division.

• NEW BRANCHES—The L.G.S. Spring Clutch Corp. has established two new sales offices. They are the L. R. Twyman & Associates, Fisher Bldg., Detroit and the Van Riper Engineering, Inc., 4 Station Square, Rutherford, N. J.

• NEGOTIATING — The Buffalo Electro-Chemical Co., Inc., of Tonawanda is negotiating for purchase of a site in Vancouver, Wash., for a multi-million dollar plant. The company has spent $3.5 million for modernization and expansion of plant facilities here during and since the war.

• COMPLETING LAB — Completion of the new research laboratory of the General Electric Co. at a total cost of $18 million is now under way. The first section of the new laboratory building at the Knolls in nearby Niskayuna, Schenectady, was formally opened in December.

• ENLARGING FACILITIES—Greatly enlarged finishing facilities that would remit an increase in its capacity for the conversion of carbon and low alloy steel ingots into slabs or plates, are being contemplated by Lukens Steel Co., Coatesville, Pa.

• ELECTS OFFICERS—The American Metallizing Contractors Assn. has recently elected Peter G. Dennison, president of the Metal Spraying Corp., Milwaukee, as president. Knowles B. Smith, vice-president and general manager of the Dix Engineering Co., Inc., Lincoln Park, Mich., has been appointed vice-president and Walter B. Meyer, manager of the Metallizing Div. of John Nooter Boiler Works Co., St. Louis, has been reelected secretary-treasurer.

• TOOL STEELS AGENT—L. E. Zurbach Steel Co., Somerville, Mass., has been appointed distributors and stockists for William Jessop & Sons, Ltd., Sheffield, England, producers of tool steels.

• BUYS EQUIPMENT — As concluding phase of its $500,000 expansion program, the John Nooter Boiler Works Co., of St. Louis, has purchased major items of equipment out of the Mount Vernon, Ill., plant of J. P. Devine Div., H. K. Porter Co., Inc. The Illinois shop has been closed by the parent Porter company.

• DISTRIBUTOR — J. M. Cranz Co., Buffalo, has been appointed distributor in western New York State for O-Rings manufactured by the Parker Appliance Co., Cleveland.

Uniform Procurement By Armed Forces Seen Munitions Board Aim

Washington

• • • **Another step** in development of uniform procurement regulations for the armed services has been taken by the Munitions Board in the issuance of a new section (Sec. XV, Contract Cost Principles) to existent regulations.

Four major items, not previously allowable, are now permissible in computing contract costs in cost-plus, fixed-free contracts in research and development, supply and material, and construction cost type of contracts.

They are state income taxes, use and occupancy insurance, ordinary charity and community benefit donations, and charges for depreciation on fully depreciated assets. After consulting with industrial associations and accounting organizations, the Board has ruled that these are "reasonable and necessary costs" of performance.

Most types of advertising in trade and technical journals may also be charged up against fulfillment of contract costs. Since the war, the General Accounting Office has refused to recognize many advertising charges as necessary to contract performance.

Specifically, the new rules allow business-paper advertising on products under contract, help wanted, sales of surplus materials and facilities, and virtually all types of classified advertising. Institutional advertising is apparently ruled out as a cost.

In issuing the new principles, the Board makes it plain that they do not apply to contracts let out under advertised, competitive bidding.

However, they will directly affect roughly some $1 billion or more contracts in the three fields covered. Indirectly, they will affect another $4-$5 billion of new production contracts with the so-called price revision clauses which are subject to periodic review. Such contracts will rely upon the cost principles as laid down in Sec. XV for a guide.

The new section of the procurement regulations became mandatory as of Feb. 1, 1949.

OIC Starts Tightening Up of Voluntary Allocations Program

OIC Director Answers Critics Of Freight Car Program; Lists All Tonnages

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By EUGENE J. HARDY
Washington Editor

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Washington

• • • **While it is** still anybody's guess as to whether the Congress will extend the voluntary allocations program operated by the Office of Industry Cooperation, officials of that small agency are proceeding with a tightening-up of the entire program.

These plans, revealed to THE IRON AGE last week by Earl W. Clark, OIC Director, call for (1) a "get-tough" attitude on new programs calling for additional steel; (2) consideration of programs in the light of the entire industry involved rather than just a segment; (3) closer checks on the use of allocated materials and possible cutbacks for firms not using allocated steel in current production, and (4) a new policy of speaking out in answer to critics of the OIC and the steel industry, particularly J. Monroe Johnson, ODT Director, who has been throwing tantrums over the freight car program.

As shown in the accompanying table, prepared for THE IRON AGE, 8 programs now in effect and scheduled for extension from March 1, 1949, to Aug. 31, 1949, require 476,422 tons monthly; 3 new programs scheduled to go into effect on Feb. 1, 1949, and run through Aug. 31, 1949, will require a monthly total of 33,342 tons, and 2 programs not recommended for extension at this time now take 38,957 tons each month. These two programs are in the housing field and no action is expected until Congress disposes of proposed housing legislation.

Anticipated new programs for oil country goods and line pipe, grain storage bins, and steel rail will also be presented to the Steel Products Advisory Committee at a meeting scheduled for Jan. 12. It is also likely that the OIC will ask for a small increase in the allocation for the anthracite mining industry and the mining machinery industry.

The OIC position on the freight car program is perhaps the best example of the new attitude pervading this agency. As is well-known, Colonel Johnson has been persistently throwing harpoons into OIC and the steel industry in an effort to raise the program above the 10,000 cars per month level now prevailing. There has never been any doubt that OIC had taken a strong position on a 10,000 car maximum program, but only recently did OIC speak out publicly and state its reasons for this position.

Mr. Clark told THE IRON AGE that OIC "is not unmindful of the importance of adequate freight cars for national defense reasons," and pointed out that he is "perfectly willing to review the situation at any time." However, there are many strong reasons which would make it unwise, in his view, to increase the program to 12,000 or 14,000 cars per month at this time.

Perhaps one of the most important, according to Mr. Clark, is the need for adequate steel for repair of serviceable cars. Also high on the list is the need for adequate rail replacement. OIC is now holding meetings with the steel industry and the railroads looking toward a program for the allocation of rails. OIC's view is that roadbeds in poor condition make for slower trains and slower trains make for more new cars.

OIC is also mindful of the fact

MONTHLY STEEL REQUIREMENTS FOR VOLUNTARY PROGRAMS IN NET TONS

Program	Bars H. R. (Incl. Reinf.)	Bars C. R.	Struct. Shapes (Incl. Piling)	Plates	Sheet & Strip	Sheet & Strip Coated	Seamless Tubing	Pipe	Rails (Incl. Acces.)	Axles, Wheels & Billets	Ingots & Slabs	Rigid Conduit	Tin Plate (Incl. Terne)	Wire (Incl. Rods & Prods.)	Total
* Freight Cars	32,885		53,640	111,347	22,309	3,125		2,961		23,415					249,682
* Atomic Energy	3,653		2,868	2,730	291	418	1,753	2,810	1,110			781			16,414
* Armed Forces	18,780	5,920	11,370	13,470	19,300	2,980	4,505	9,540	510	210	11,140		330	4,450	102,505
* Tank & Oil Field	1,019		254	6,573	8,030			654							16,530
* Barges	300		6,500	17,700	150			350							25,000
* N. A. C. A.	540		600	575		86		114	11						1,926
* Tankers	1,041		5,265	32,011	288	287		1,488							40,380
* Merchant Vessels	670		1,905	11,143	421	519		757							15,415
(1) Oak Ridge Pipe Line								4,750							4,750
(1) Mining Machinery	7,100	230	6,560	7,165	3,765		720	375			485				26,400
(1) Manganese Ore Cars			445	1,025	722										2,192
Total New & Extended Programs	65,988	6,150	89,407	203,739	55,276	7,415	6,978	23,799	1,631	23,625	11,625	781	330	4,450	501,194
(2) Warm Air Heating					18,987	10,135									29,122
(2) Steel Houses					9,625	210									9,835
(3) Anthracite				550	750	410		860							2,570
Total				550	29,362	10,755		860							41,527

* Programs now in effect and recommended for extension March 1, 1949 to August 31, 1949.
(1) New Programs effective February 1, 1949 to August 31, 1949.
(2) Programs in effect but not recommended for extension at this time.
(3) Will be recommended for extension, now in effect.

Compiled by Iron & Steel Division, Office of Industry Cooperation, Dept. of Commerce, Dec. 22, 1948.

that one of the basic materials in freight car production is steel plate which is in critically short supply. The agency's official position is as follows: "Undue diversion of plate at this time to any one industry or program might create a serious dis-equilibrium in industrial production. The following figures indicate the extent to which the car building program has already affected the distribution of plate:

	Total Steel Plate Production	*Railway Building and Repair*	*Percentage of Steel Plate Production Consumed for Car Building and Repair*
1946	4,152,181	408,062	9.8
1947	6,345,216	719,389	11.3
Est. 1948	6,700,000	1,200,000	18.0

"It is estimated that an increase of freight car production to 12,000 cars monthly would require over 20 pct of all the steel plate produced in the United States. In view of the extent to which other essential consumers of plate are being cutback in their receipts, it is the considered judgment of the OIC that any proposal to allot more plate to the freight car program than is presently being allocated should be subjected to the most careful study and review before affirmative action is taken."

The present voluntary plan has been in effect since Apr. 1, 1948. Since that date, and up to Dec. 1, a total of 75,934 freight cars had been produced, or an average of 9492 cars monthly. In addition, up to Nov. 1 a total of 232,120 cars had been given heavy repairs.

Mr. Clark further points out that existing freight car orders do not show the need for an accelerated program at this time. OIC states that "it is not apparent from the record that the railroads are prepared at this time to support a car building program in excess of 10,000 cars monthly.

"**During the** period from Apr. 1 to Dec. 1, 1948, a total of 75,934 new cars were shipped as against an aggregate of 59,195 new car orders. On Apr. 30, 1948, there were 135,176 freight cars on order and undelivered. On Dec. 1, 1948, this figure had diminished to 106,402 freight cars of all descriptions. The OIC has received no evidence of any impending volume of new orders that would materially increase this backlog."

"The steel producers have cooperated in the operation of the voluntary agreements program. Whenever they were presented with fully substantiated programs they have responded quickly. I compliment them on the manner in which they have cooperated." This is Mr. Clark's reply to Colonel Johnson and other critics of the steel industry's part in the voluntary set-up.

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HOBBING STEEL: *Westinghouse materials engineers have come up with a hobbing steel that is soft enough to permit easy hobbing but yet has properties that permit gas carburizing in an Amogas furnace using an atmosphere of hydrogen and methane and hardening by cooling in the protective cooling chamber of the furnace.*

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Says West Coast Will Need A Lot of Scrap Next Year

Seattle

• • • **Three times** as much steel scrap as in prewar days will be required in the next year by the steel and foundry industries of the West Coast, according to H. W. Christensen, director of purchases, Columbia Steel Co., U. S. Steel's West Coast subsidiary. Only recently Mr. Christensen's company added to its Pittsburg, Calif., plant facilities that will increase the nation's sheet and tin plate output by more than 300,000 tons a year.

Scrap suppliers, from whom this quantity of scrap will have to come, were told they are "conservers of our natural resources" in that they play a vital part in keeping steel industry operations at capacity and in saving iron ores which will be needed in the future to make goods for the American consumer in peace and war times. Mr. Christensen spoke before the Pacific Coast Conference of the Institute of Scrap Iron & Steel, meeting in Seattle.

"Contrary to some impressions," said Mr. Christensen, "the scrap industry is the most important independent supplier of raw materials to the steel and foundry industries. Every ton of scrap melted conserves 3½ to 4 tons of irreplaceable natural resources to say nothing of the smaller requirement of transportation facilities."

Reports on Utah Ore

Washington

• • • **Estimated** potential reserves of 500 million long tons of iron ore, including substantial tonnages of good-quality ore suitable for Western steel production, are available in Iron County, Utah, according to a recent survey report by the Bureau of Mines.

Supplementing a previous report on the Bureau's exploratory work in the iron belt of southwestern Utah, the publication was prepared by Paul T. Allsman, chief of the Salt Lake City Branch of the Bureau's Mining Div.

A free copy of Report of Investigations 4388, "Investigation of Iron Ore Reserves of Iron County, Utah" (Supplement to R. I. 4076) may be obtained from the Publications Section of the Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

U. S. Steel Will Add 600,000 Tons of Capacity in 1949

Pittsburgh

• • • **Disclosure by** Benjamin F. Fairless that U. S. Steel would increase its ingot capacity by 600,000 tons next year came as a surprise to most steel men here. It had been known that about 300,000 tons would be added to the corporation's rated ingot capacity by new bessemer converters at National Tube Co., Lorain, Ohio. Speculation here was that the heretofore undisclosed additions would come at the Duluth Works of American Steel & Wire Co.

Operating men were glad to see the way the U. S. Steel Corp. president emphasized the difference between capacity and production. Demands have been made for increased capacity while too little has been said about increased production, he emphasized. But production, not capacity, is what meets the needs of the consumer.

Mr. Fairless set probable ingot production in 1949 at 92 million tons, yielding 68 million tons of finished steel. The latter figure would be 3 million tons better than this year's output and 5 million tons more than the industry made in 1947.

He emphasized that U. S. Steel was spending millions on better-

STEEL INGOT CAPACITY, COMPARED WITH INGOT & FINISHED STEEL PRODUCT PRODUCTION

(In thousands of net tons)

YEAR	INGOT CAPACITY	INGOT PRODUCTION	TONS OF FINISHED PRODUCTS
1941	85,158	82,839	60,942
1942	88,886	86,031	60,591
1943	90,589	88,836	62,210
1944	93,854	89,641	63,250
1945	95,505	79,701	56,602
1946	91,890	66,602	48,775
1947	91,241	84,894	63,057
1948	94,233	88,000 (est.)	65,000 (est.)

1942–1945	
Average Annual Ingot Production	86,052,000 Tons
Average Annual Finished Product Production	60,663,000 "
1947	
Ingot Production	84,894,000 "
Finished Product Production	63,057,000 "
1948	
Ingot Production Estimated	88,000,000 "
Finished Product Production Estimated	65,000,000 "
1949	
Ingot Production Probable	92,000,000 "
Finished Product Production Probable	68,000,000 "

ing coal quality to increase pig iron yield. It will definitely increase steel production though the better coal program may not change rated capacity by a single ton, he pointed out.

American Machinery Is Authorized for France Through Marshall Plan

Washington

• • • **Purchase of** $2 million worth of American machinery and equipment through Marshall Plan credit for the purpose of boosting French tinplate production more than a third has been approved.

The equipment is for expansion of the plant of J. J. Carnaud & Forges de Basse-Indre of Nantes. It will increase the plant production by 50,000 tons and raise French tinplate output as a whole from 125,000 to 175,000 tons annually.

Major items of equipment from American suppliers will include a 4-high cold roll reversing mill, 16 in. and 43 in. by 44 in.; a 16 in., 20½ in. and 43 in. by 44 in. combination reversing and cold reduction and skin pass mill; a strip pickling line, strip steel cleaning line, and shearing line, and necessary related equipment.

While ECA credit will be issued to Carnaud & Forges on a down payment and installment basis, eventually a large portion of the repayment will be shouldered by French private investments.

Delivery of the needed American equipment is expected to be completed within 14 months, and raw material supplies will be furnished by a new French steel mill.

This is a plant now under construction at Denain-Ancin in northern France (not financed by ECA). It is expected to be producing hot rolled sheets by the end of 1949.

Expansion of French tinplate facilities is the second recovery project recommended by ECA's recently formed Industry Projects Committee. The first was construction of a modern blooming mill (THE IRON AGE, Dec. 9, 1948, p. 156) for the Alpine steel works at Donawitz, Austria.

40 Pct of New Expansion Attributed to New Firms

Washington

• • • **About 40 pct** of all capital invested by trade firms in new facilities, expansions, equipment and inventories during the 1945-47 period came from newly established firms, according to the Office of Business Economics.

During the period, 70,000 new wholesale firms went into business and 590,000 retail businesses took root. Between them, $7 billion was invested. Two-thirds of the financing was from personal savings and about 15 pct was obtained from banks.

Construction Steel . . .

New York

• • • **The estimated total bookings** of fabricated structural for the first 11 months of the year amounted to 1,792,784 tons, an increase of 21 pct over the bookings for the corresponding period of 1947. November bookings were down from the previous month, but were 4 pct over November of last year.

November shipments were 164,850 tons, slightly over October. The total shipments for the first 11 months were 1,804,701 tons.

The backlog (tonnage available for future fabrication) for the next 4 months only has increased to 672,550 tons.

Following is the complete tabulation of bookings and shipments:

ESTIMATED TOTAL TONNAGE FOR THE ENTIRE INDUSTRY

Contracts Closed	1948	1947	Average 1936-40
Jan.	160,634	104,973	107,578
Feb.	130,119	125,881	96,280
March	213,123	149,634	124,558
April	154,082	161,338	110,783
May	141,764	112,954	126,237
June	162,367	103,273	125,835
July	177,687	153,540	152,481
Aug.	172,485	146,382	113,135
Sept.	180,422	134,630	137,982
Oct.	161,758*	159,132	141,557
Nov.	138,343	132,916	129,757
Totals	1,792,784	1,484,653	1,366,183

Shipments	1948	1947	Average 1936-40
Jan.	146,363	140,650	92,578
Feb.	141,556	136,126	88,626
March	167,029	137,799	115,031
April	166,687	157,392	123,650
May	186,915	154,980	123,225
June	157,109	151,882	129,969
July	160,780	169,911	127,422
Aug.	176,306	157,952	136,389
Sept.	174,967	164,345	137,255
Oct.	162,139*	196,139	140,944
Nov.	164,850	175,000	127,873
Totals	1,804,701	1,742,176	1,342,962
Tonnage available for fabrication within the next four months	672,550	645,440	350,268

* Revised

50 YEARS AGO

THE IRON AGE, *December 29, 1898*

• European manufacturers of iron, steel, machinery and related products are beginning to raise their eyebrows. Up until now they had only each other to look out for on the foreign trade markets. But the rapid and successful growth of American industry is starting to give them concern. They always felt that the United States would never be a formidable competitor because relatively higher labor, material and operating costs would hinder us from ever emerging as an iron exporting country. All of this is being proven wrong. Discovery and application of cheaper supplies of iron ore and cheaper transportation by land and water have been largely responsible for the big reduction in our iron-making costs.

• **Demand for iron and steel in December, normally a dull month, is unprecedented. This is simply a forerunner of what is to come in 1899. The outlook could hardly be better. Already over 1 million tons of rails have been sold for next year. Pig iron output which is over 11 million tons this year will probably exceed 12 million tons next year. Even this will not supply demand. Every indication points to 1899 as the best year in the history of the iron trade.**

• Another small wire company has taken shelter in the refuge of the steadily growing combines. Last week the Pittsburgh Wire Co. passed into the control of American Steel and Wire Co. Business, however, will still go on under the original name.

• **Steel sheets have provided one of the few distribution headaches to the industry. Prices have been low all year. Most makers have sold at no profit or even at a loss in an effort to develop a market. But demand has been less than fair. Hopes are that 1899 will bring out new demand and better prices for this product.**

• Steel frame construction in modern buildings is growing increasingly popular. In keeping with its educational standards, Massachusetts Institute of Technology has introduced an architectural engineering course in the curriculum.

• • • **Fabricated steel awards** this week included the following:

1500 Tons, Edge Moor, Del., power plant for Delaware Power & Light Co., to Bethlehem Steel Co., Inc., Bethlehem.

1250 Tons, Dayton, Ohio, State highway bridge section MO-35-13 NO-35-14, through Bates & Rogers Construction Corp., to Bethlehem Steel Co., Inc., Bethlehem.

450 Tons, Cornell, Wis., Holcomb Hydro plant for Northern States Power Co., to American Bridge Co., Pittsburgh.

185 Tons, Power Co., Colo., State highway bridge section S000-1, to American Bridge Co., Pittsburgh.

175 Tons, Island Trees, L. I., Jerusalem grade school No. 2, Division ave., to Grand Iron Works, Inc., New York.

170 Tons, Hershey, Pa., power plant addition, to Lehigh Structural Steel Co., Allentown, Pa.

160 Tons, Watertown, S. D., St. Anne's Hospital, to Hassenstein Steel Co.

150 Tons, Blue Island, Ill., warehouse addition, through Abel Howe Construction Co., to J. T. Ryerson & Son, Inc., Chicago.

135 Tons, Chicago, Hebrew building, South Side, to Wendnagel & Co., Chicago.

130 Tons, Chicago, Oakland Kenwood grade school to Duffin Iron Works, Chicago.

• • • **Reinforcing bar awards** this week included the following:

450 Tons, Minneapolis, Jewish hospital through Standard Construction Co., to U. S. Steel Supply Co., Chicago.

350 Tons, Embreeville, Pa., State hospital building, to McCloskey & Co., Philadelphia.

220 Tons, Brighton, Mass., new warehouse for General Electric Supply Co., Boston, through Thomas Worcester, Inc., Boston, to Bethlehem Steel Co., Bethlehem.

100 Tons, Henry Co., Ill., dam project for Conservation Dept., State of Illinois, to John Macklind Co.

100 Tons, Wildwood, N. J., Grassy Sound bridge, to Kolyn Construction Co., Trenton, N. J.

100 Tons, Brighton, Mass., new warehouse for General Electric Supply Co., Boston, through Thomas Worcester, Inc., to Concrete Steel Co., Boston.

• • • **Reinforcing bar inquiries** this week included the following:

1000 Tons, Boston, 3 off-street parking garages for the City of Boston, through Thomas Worcester, Inc., Boston.

1000 Tons, Philadelphia, William Sayre junior high school, McCloskey & Co., Philadelphia, low bidder.

450 Tons, Lycoming Co., Pa., Little Pine Creek Dam, Lycoming Construction Co., Williamsport, Pa., low bider.

225 Tons, Norristown, Pa., male patients' building for State Hospital, Wark & Co., Philadelphia, low bidder.

• • • **Steel piling awards** this week included the following:

600 Tons, Garrison, N. D., Garrison Dam project, to Inland Steel Co., Chicago.

Stainless Prices Still Confused Despite New Extra Schedules

New Extras Seen Not Meeting Price Objections Raised Among Distributors

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By JOHN ANTHONY
Eastern Regional Editor

o o o

Philadelphia

• • • **The new extra** schedules for stainless steel products recently announced by the United States Steel Corp. are not expected to clarify the present confused stainless steel price situation. Some stainless producers are not convinced that the new extra schedules will be followed generally, as they say that they do not meet objections to the new stainless steel prices raised by consumers and distributors. Certain producers are now on the verge of announcing new extra schedules with lower sheet polishing extras than those of Carnegie-Illinois, and carrying a higher functional discount to distributors.

Ever since last summer the stainless steel market has been in a chaotic condition because of the wide variation in prices being charged by producers. The condition has been particularly acute in the sheet and bar markets, in which there have been at times as many as seven different quoted prices on a single tonnage. Some sheet producers are still charging the old prices and extras plus 10 pct. There is still a wide variation in the bar market, although two producers recently raised their prices to the generally prevailing price schedule.

Warehouses who have appraised the new corporation schedules of extras find them more satisfactory than those established last summer, from their own standpoint and that of their customers, but not all that could be desired to aid in the promotion of stainless steel products. The hubbub set up by distributors over the loss of the functional discount has apparently borne fruit, for the new schedule provides for a discount of 5 pct on sheets, strip and bar shipments to warehouses. The former functional discounts were 10 pct on sheets, 7½ pct on strip and 5 pct on bars. No discount has been reinstated for direct mill shipments.

Armco Steel Corp. now allows warehouses to combine standard lengths and widths in the same gage in figuring quantity extras on sheets. They have reduced the jobber's direct-shipment discount from 7½ pct to 5 pct. Some producers expect to announce a functional discount of 7½ pct. Some sheet producers have never discontinued the 10 pct discount to distributors.

Producers who have studied the new extra schedule are concerned over the failure to make more important reductions in polishing charges. They say that these items of cost are the principal obstacle to a more rapidly expanding market for stainless steel sheet. High polishing extra charges are also said to be largely responsible for the important discrepancies in sheet prices.

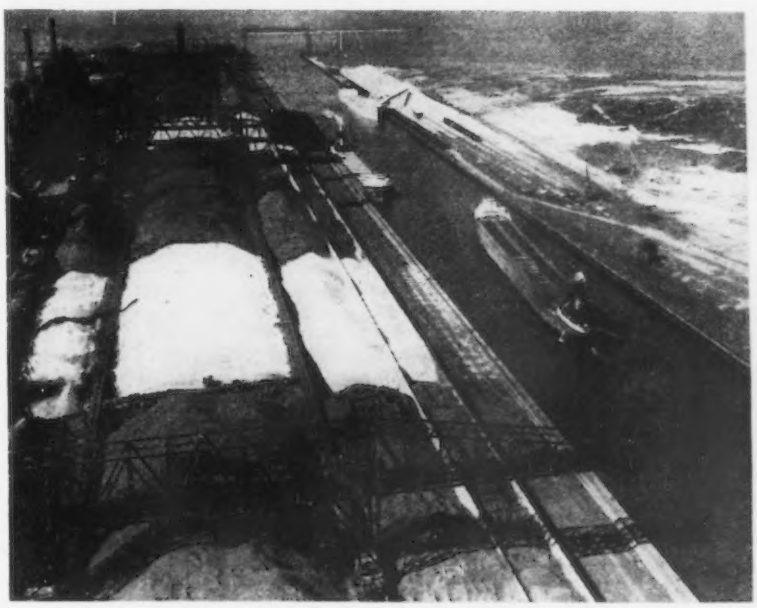
The new polishing extra schedule appears at first glance to reflect significant reductions, but when gage extras are added in as required by the new schedule only the lightest gages are reduced significantly. Previous schedules included the gage extra in the polishing extra charge.

Gage extras for sheet have been reduced by the new schedule by 1¢ and 2¢ per lb in the lighter gages.

Quantity extras for sheets, plates, bars and cold-rolled strip have been reduced by about 50 pct for shipments of more than 1000 lb. The base quantity of 10,000 lb, a reduction from 40,000 lb made last summer, has not been changed.

Warehouse distribution of stainless steels is assuming a more and more important position in the field. For almost every stainless product, shipments to warehouses in the first 9 months of 1948 represented significantly heavier tonnages than in the same period of 1947. During that period shipments of cold-rolled sheets to warehouses represented 48.5 pct of production, as compared with 33.8 pct in the first 9 months of 1947. Plates were 30.7 pct in 1948, an increase of 8.5 pct. Cold-finished bars shipped to warehouses

SEASON'S END: *These 3 ore boats closed the navigation season at the Gary works of U. S. Steel's Carnegie Illinois subsidiary. This is the latest closing date in the 40-year history of the harbor. Over 5 million tons of ore and limestone are shown here. They provide the company's winter supply.*



were 32.9 pct of production, up 8.2 pct from last year. Hot-rolled bars to warehouses were 22.3 pct, up 6.6 pct. Hot-rolled sheets shipped to warehouses reached 24 pct, down 7.4 pct from last year. Cold-rolled strip shipped to warehouses was 5.4 pct of production, compared with 4.2 pct last year. Mechanical tubing and pressure tubing bought by warehouses represented 44 pct and 40.8 pct of production, respectively. Total shipments of stainless products to warehouses in the 9 month period were 55,535 tons, 23.38 pct of stainless production.

Stainless Steel Sheet Extras
(Cents per pound)

Gage Extras

	Carnegie-Illinois Dec. 20, 1948	August 1948	Earlier Schedule
16 gage	1	1	none
18	2	2	none
20	3	3	none
22	5	6	none
24	6	8	1.25
26	10	12	5.50

Polishing Extras*

(No. 4, one side)			
16	8.50	9.50	8.50
18	9.25	11.25	9.25
20	12.00	15.00	12.00
22	17.25	23.00	17.00
24	21.00	27.00	20.25
26	24.75	40.25	28.25

*The new schedule requires that gage extras be added in, not required by previous schedules.

Quantity Extras

10,000 lb and up	none	none
8,000 to 9,999	2.00	2.00
5,000 to 7,999	2.25	4.00
2,000 to 4,999	3.25	
3,000 to 4,999		7.00
2,000 to 2,999		9.00
1,000 to 1,999	5.50	10.00
500 to 999	8.00	12.00
300 to 499	10.75	14.00
100 to 299	14.00	18.00
Up to 100 lb	20.00	23.00

Further Effort Made To Clear Up Smog Tragedy

Cleveland

• • • **As a further** step in attempting to clear up the uncertainty surrounding the deaths of 19 persons during the course of a heavy 5-day smog at Donora, Pa., recently, the American Steel & Wire Co. has engaged the Kettering Laboratory of Applied Physiology in the College of Medicine, University of Cincinnati, to carry on an investigation in the area to determine what conditions contributed to the tragedy.

"We are intensely concerned with this problem and will continue to do everything possible to clear up the mystery surrounding the tragic occurrence," H. B. Jordan, operating vice-president of the company, stated. "The Kettering group is a highly regarded authority on problems of industrial and public health."

The work of the Laboratory is concerned primarily with occupational hazards and diseases, their nature and significance, and the means of preventing them.

Auto Orders Are 60 Pct Phony Says GM Official

Pontiac

• • • **If someone** comes up with a sound method for identifying a phony automobile order, the consumption of aspirin in the automotive capital will diminish overnight.

This was illustrated last week when Pontiac's general manager, H. J. Klinger, invited the Detroit press to have an advance look at the new 1949 Pontiacs.

Admitting that his own company had more than 700,000 orders on the books, Klinger said that, in his opinion, it was probable that not more than 60 pct were good orders.

Pontiac's production for 1948 will reach 245,000 cars and present expectations are there will be an increase of 10 pct in 1948—if steel is available.

Klinger predicted that all station wagons in the future will be made of steel. He sees no justification for continued production of station wagons made of wood, and indicated that Pontiac may soon go into production on a new all-steel model.

Army Orders New Type Of Air-Cooled Tank Engines

Muskegon

• • • **The Army's engine** standardization program took a long forward step this week with the placing of an initial order for $18,800,000 with Continental Motors Corp. for an undisclosed number of new type air-cooled tank engines.

The Government order authorized immediate purchase of necessary facilities and tooling. Production of the new engines is expected to start within a few months, according to C. J. Reese, president of Continental.

Coming Events

1949

Jan. 10-14 **Society of Automotive Engineers,** annual meeting, Detroit.

Jan. 10-14 **Material Handling Institute and American Society of Mechanical Engineers,** Materials Handling Show, Philadelphia.

Jan. 14 **Malleable Founders' Society,** semiannual meeting, Cleveland.

Jan. 24-25 **Industrial Furnace Manufacturers Assn.,** mid-winter meeting, Cleveland.

Jan. 24-28 **American Society of Heating & Ventilating Engineers,** annual meeting, Chicago.

Feb. 9-10 **Steel Founders Society of America,** annual meeting, Chicago.

Feb. 14-17 **American Institute of Mining & Metallurgical Engineers,** annual meeting, San Francisco.

Feb. 28-Mar. 4 **American Society for Testing Materials,** spring meeting, Chicago.

Mar. 8-10 **Society of Automotive Engineers,** passenger car, body and production meeting, Detroit.

Carnegie Tech Decides Costs Won't Drop; Will Go Ahead With Building

Pittsburgh

• • • **Carnegie Institute** of Technology has resumed $4 million campus building and renovation program. Carnegie will build a $1 million wing on to Engineering Hall and will spend over $1 million on a power plant and a steam and electricity distribution system. The program also calls for extensive revamping and renovation of available space in existing buildings of the colleges of Engineering and Science, Fine Arts and Margaret Morrison Carnegie College.

Originally decided upon in March, 1947, the building plans have been held in abeyance in hopes that high building costs would drop. Estimates received in 1947 showed that what the school planned to do in its $4 million program would cost approximately $7 million.

According to Carnegie president Robert E. Doherty, the decision to go ahead with the plans now was made because "we are advised that a significant drop in building costs cannot be expected in the near future."

Ground is expected to be broken for the new engineering hall this spring, and the whole building and renovation program is expected to cover approximately a two year period.

This $4 million program, according to president Doherty, is part of the Carnegie long-range physical development which calls for such major campus additions as a new library, auditorium and gymnasium.

Asked where the funds for this program came from, president Doherty replied, "Unfortunately, it was necessary to use capital funds which has up to now been providing sorely needed endowment income."

Lays Off 100 Employees

Buffalo

• • • **American** Machine & Foundry Co. has laid off 100 employees, mostly nonproduction workers like clerks and office help, to "cut costs and bring down prices." Present employment is over 450.

Output of Turbine-Generators by GE is 1 Million KW Higher

Schenectady, N. Y.

• • • **General Electric's** production of large turbine-generators for electric utilities during the past year exceeded production of any previous year by more than 1,000,000 kw. J. W. Belanger, manager of G-E's turbine divisions said that 11 more units were manufactured in 1948 than in any other peacetime year in the company's history.

In all, 65 units with a total generating capacity of approximately 2,932,000 kw—an average of about 45,000 kw per unit—were produced in the Schenectady plant, he declared.

This more than doubles, in capacity, the plant's 1947 production of 1,200,000 kw, when 34 units with an average rating of 35,300 kw were turned out.

More than 2 million kw of the past year's production already have been placed in operation.

In addition to the 1948 record output at the Schenectady plant, smaller units produced at the Lynn River and Fitchburg, Mass., works represent an output of 650,000 kw. These include turbine-generators and turbines for a large variety of industrial plants, some utilities and ships.

Great strides in the development of gas turbines highlighted the year, Mr. Belanger said.

The 4800-hp oil-fired gas turbine power plant especially designed for locomotive application was installed in an Alco-GE locomotive after completing more than 700 hours of stationary test runs in the factory. By mid-November, the gas turbine-powered locomotive had begun track tests at General Electric's Erie, Pa., works.

Construction was started during the year on two 3500-kw gas turbine power plants for land installation. Oklahoma Gas and Electric Co. will operate one of these with natural gas as fuel and will use the exhaust gases to heat boiler feed-water.

The 3500-kw unit for Central Maine Power Co. will be oil-fired and will be installed in an existing station to replace a 2000-kw, 1800-rpm steam unit.

Two 5000-kw high efficiency gas

turbine power plants for the Public Service Co. of Oklahoma will utilize natural gas as fuel. Also on order, for the Bangor Hydro Electric Co. is a 5000-kw, high efficiency unit similar to these, but oil-fired.

The 5000-kw gas turbines are the largest so far ordered for utility service in the U. S. They will utilize intercooling and regenerative heat-transfer surfaces to recover waste heat. Mr. Belanger said it is expected that the fuel economy of these plants will be competitive with steam plants of equal size.

The G-E spokesman pointed out that the past year saw renewed interest in the resuperheating cycle, which has been applied to 2 million-kw of Schenectady-built turbines in the past 20 years. Seventeen units, with more than 1.5 million kw capacity for the resuperheating cycle, now are being built at Schenectady, he declared. Initial pressures range from 1250 to 2000 lb per sq in.

Enameled Steel Plumbing Fixture Sales Gain Is 2700 Pct for 10 Years

Washington

• • • **In a period of less** than 10 years, 3 of which saw almost no production at all, the dollar volume volume of porcelain enameled steel plumbing fixtures has soared to an estimated total of $47 million for the year 1948 . . . an increase of 2700 pct according to the Porcelain Enamel Institute.

In 1946, porcelain enameled steel plumbing fixtures accounted for 40 pct of the total of all metal plumbing fixtures produced in this country. In 1948, despite the shortage of the required special porcelain enameling steel, the industry's share of the metal fixture total was about 30 pct, the institute report stated.

During the third quarter of 1948, shipments of all metal plumbing fixtures were valued at $41,424,000, of which $11,628,000, or approximately 30 pct, represented porcelain enameled steel fixtures. Shipments of metal plumbing fixtures during the first nine months of this year were valued at over $123 million, an increase of 42 pct over shipments for the same period of 1947.

Asks for Moratorium Upon Triple Damages Sought in FTC Suits

Washington

• • • **Senate hearings** on the Federal Trade Commission's attitude toward delivered prices have brought a plea for a moratorium on triple damage suits brought by FTC under the Robinson-Patman Act.

The plea was presented by Albert Y. Bingham, vice president of the Chicago Title & Trust Co., who asked that such a moratorium be made effective for the duration of congressional debate on the f.o.b. vs. delivered price issue.

Mr. Bingham said it might well be that the country as a whole would be better off if it had practiced f.o.b. pricing from the beginning. But he called attention to damage which would be done to investors by the present adoption of universal f.o.b. pricing.

"**The present** and proposed changes in pricing practices in various industries will have a very unsettling effect upon investors," he told Senator Capehart's Trade Policies Subcommittee. He pointed out that many companies have more stockholders than employees and declared that since no worker can be employed until after from $3,000 to $50,000 of capital per employee in the form of plant, tools, and equipment has been supplied by the investors, capital, like labor, "is entitled to a fair reward for services rendered."

"Unto everyone that hath shalt be given and he shall have abundance, but from him that hath not shall be taken away even that which he hath," Mr. Bingham quoted. Similarly, he said, in every case he had investigated to date, f.o.b. pricing "has a tendency to hurt the small and benefit the large."

Although the proponents of f.o.b. pricing have stressed the long-range advantages of the decentralization it would bring about, most of the cases examined "would lead one to think that centralization would be the more likely outcome," he stated. Even if these proponents are correct, he said, the dislocations in the next 10 or 20 years would be great.

Witnesses from the paper, glass, lumber, and insecticide industries also expressed opposition to mandatory f.o.b. selling.

Canadian Nickel Output Sets Peacetime Record

Copper Cliff, Ont.

• • • **Total world** deliveries of Canadian nickel in all forms for the year 1948 will set a new high peacetime record, according to Robert C. Stanley, chairman and president of International Nickel Co. of Canada, Ltd. The two previous peacetime peak years were 1947 and 1937.

The principal nickel companies in Canada operated at high levels during the year to supply the unprecedented peacetime demand for the metal. The French production from the New Caledonian nickel deposits, however, is reported to have been relatively small, with 1948 output estimated at well under that of the preceding year.

Cuban production will not figure in this year's total as the mines in that country, which had been worked from 1943 to the early part of 1947, remained closed. Since Russia does not release information on metal production, it is not feasible to estimate that country's 1948 nickel output.

The production of the Canadian nickel industry, in common with that of other industries in Ontario, has been hampered in recent months by electric power shortage brought about by the lack of rainfall during the summer and autumn. Power restrictions may continue throughout the winter months.

During the latter half of the year prices quoted by International Nickel for electrolytic nickel were raised by reason of increased production costs, including supplies, services and labor, and the fact that the company must mine lower grade underground ore bodies to continue a large and steady supply. These increases brought the price level of nickel to well above that prevailing in the pre-war years.

Earnings Increase 10 pct

Buffalo

• • • **The Electro** Refractories & Alloys Corp.'s sales and net earnings for 1948 are approximately 10 pct greater than in 1947, Grant S. Diamond, president, said. Directors declared the regular quarterly dividend of 17½ cents a share, payable Jan. 1 to holders of record Dec. 20.

MACHINE TOOLS

. . . News and Market Activities

Some Machine Tool Builders Up Prices Average of 6 to 10 Pct

• • • **Last roundup** of 1948 . . . price increases averaging 6 to 10 pct have been announced by a number of machine tool builders, most recent of which is Warner & Swasey Co., Cleveland. (see below.)

It was also learned this week that Alexander S. Keller, vice-president and sales manager of the foreign department, Pratt & Whitney, West Hartford, Conn., has been named ECA machine tool administrator for the Netherlands. Mr. Keller's headquarters will be at The Hague. It is understood that Mr. Keller has accepted the appointment for 1 year. He will be on leave of absence from Pratt & Whitney during that time.

In Cleveland, National Machine Tool Builders' Assn. had adopted a change in constitution that will make eligible for membership builders of metal forming machine tools of a type used to press, forge, emboss, hammer, blank or shear metal.

NMTBA's index of new orders and shipments of machine tools, released this week, shows new orders for November rose to 73, compared with 67.4 for October and 75.6 for November 1947. Foreign orders, included in the new order total, were 18.5 for November, compared with 14.0 for October and 11.5 for November 1947. November shipments were 75.5 compared with 80.4 for October and 84.7 for November 1947. Ratio of unfilled orders to shipments was 4.4 to 1, compared with 4.2 to 1 for October and 5.1 to 1 for November 1947. While November figures are preliminary, the industry will very likely reach total shipments of $280 million for 1948.

Also in Cleveland, Warner & Swasey Co. was strikebound Monday morning when members of Local 1253 of the International Assn. of Machinists (independent), singing Christmas carols, formed picket lines at shop entrances to enforce a wage demand of 19 cents an hr. More than 1800 employees are involved.

The strike followed nearly continuous negotiations since late October. In answer to the union's demand for a 19 cent an hr increase the company proposed 5 cents an hr across the board or 5 to 15 cents an hr on a sliding scale. According to a company statement, the union prior to the strike deadline reduced its demand to a flat 10 cents an hr increase for all employees, which the company rejected.

Alexander S. Keller Is Named ECA Administrator for the Netherlands

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Sellers of machine tools in the Chicago area report first quarter business looks good. Buyers are looking back at 1948 and realizing that in spite of everything, they had a very good year. They are opening up their budget and deciding that all the dire predictions after election just won't happen. There has been a continued heavy volume in capital investment, particularly in the construction machinery field. Across the board industry-wide, volume for next year is holding up. The only two exceptions are household appliances and regular radio makers.

Government purchases are expected to increase shortly. The Navy is planning to modify many of its seagoing machine shops. Arsenal programs are as yet undefined, but additional business is expected from this direction soon. Minneapolis - Honeywell Co. has just closed a government contract for aircraft equipment. Nothing concrete has emerged yet on actual tooling, but a fair sized program is expected.

Foreign orders on the ECA program are starting to dribble through. The big volume still remains in the paper stage but the machine tool makers and sellers fully expected this business to break before second quarter of next year.

Deliveries on practically all types of tools are very good. Certain large presses are promised in 5 months, but this is the slowest delivery on any item. Last month saw one price increase by a lathe maker. This 10 pct increase was long overdue. Prices on this particular line have been ridiculously low for some time.

In Detroit, informed sources see no immediate change in machine tool price levels. It is explained that a recent announcement by a prominent supplier covered only single spindle automatics which had not been boosted in July. Indications are that machine tool suppliers here hope to hold the price line, at least until a fourth round of wage boosts becomes a certainty.

The machine tool industry in Detroit is quiet at the moment, but informed sources are reasonably optimistic as they look forward to the new year. It is pointed out, for example, that new automotive engine programs have only got started. Olds is already planning to increase its present new line and the possibility that a similar program may be undertaken in the near future for the Olds six-cylinder engine is seen by some observers here. Also, the prospect that other GM divisions, as well as its competitors, may embark on similar engine programs is encouraging.

Another encouraging phase of the present machine tool market is the growing acceptance by the motoring public of automatic transmissions. Additional placements for the Saginaw transmission plant of Chevrolet are reported this week and there are recurring reports that Borg-Warner may soon make definite commitments on the transmission it will build for Mercury and Lincoln

NONFERROUS METALS

. . . News and Market Activities

Copper Consumption Pattern To Bring Changes in Industry

New York

• • • **Heavy demand** for copper in the last three years has obscured the details of a major trend in the copper distribution pattern which can be expected to have an important impact on consumers and producers once the market begins to fall off. It will be certain to change the price relationship between copper consumed in the East and in the Midwest.

Historically, the heavy consuming area for copper has been the Connecticut Valley, and relatively small tonnages have been consumed in the Midwest. In order to serve the Eastern market, a half dozen refineries were established at eastern seaports where they were in a position to handle foreign concentrates, as well as those from domestic mines and smelters. The combined tonnage of all the eastern refineries is approximately 100,000 tons per month.

This distribution of refining capacity made it possible for the industry to establish a slightly lower price to copper consumers in the East. Midwestern consumers are required to pay a premium for the additional freight involved.

Wartime plant construction of copper consuming industries was very largely in the Midwest. Many of these plants have been bought or leased and are still in operation. This has changed the distribution pattern for the metal, but midwestern consumers are still paying a premium for copper. The industry has taken steps to rectify the situation and is constructing refining capacity in the West close to mines and smelters.

The first important step in this direction was taken by Kennecott Copper Co. when it began the construction of a new refinery at Hurley, N. M. Other western refineries are operated by Anaconda Copper Co. at Great Falls, Mont., Phelps-Dodge at El Paso, Tex., and American Smelting & Refining Co. at Tacoma, Wash. Expanded western refining capacity will make it unnecessary to ship concentrates east for refining and then return a large proportion of refined copper to midwestern consumers.

Heavy Demand During the Last Three Years Has Obscured Details of New Trend

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Some industry members are convinced that when a lower rate of copper consumption makes its effect felt, there will be an important falling off of the tonnages handled by eastern refineries. There is no doubt that such a development would be accompanied by an adjustment of the price of copper to eastern and western consumers. The premium will be applicable then to deliveries to the Valley, reflecting the savings made possible in freight costs by direct shipments to midwestern consumers.

Copper consumption by domestic industry is about 100 pct higher since the end of the war than the high level consumption prewar years of 1936-38. Few members of the industry believe that there will be such a decline in copper consumption in the next few years as to bring about an abrupt dislocation of the industry's production and distribution pattern. Belief that the copper consumption of the country is on a higher plateau from which there can be no drastic retrenchment has encouraged several copper producers to plan into the future for extensive programs for the development of lower grade ores.

If this holds true, it may permit continuation of our imports of copper on a scale large enough not to jeopardize the continued operation of eastern refining plant.

Consumers of copper, lead and zinc found no improvement in supplies of those metals last week. Further evidence develops that the gray market purchases of metals has taken an important decline.

The European quicksilver cartel has advanced the price of the metal by $14 a flask. This brings the domestic price to a range of $92 to $94 a flask. This is the only metal that is now moving at lower prices than wartime price ceilings, some 100 pct higher. The low price adhered to by the cartel for Spanish and Italian mercury ever since last summer, $56 a flask at foreign ports, has been the cause of closing down many domestic operations. As the result of the low foreign price, imports of mercury rose sharply in 1948. Imports in the first half of 1948 reached 27,254 flasks, compared with only 10,228 in the year 1947. Only 8900 flasks were produced by United States miners in the first half of 1948, compared with 23,244 flasks produced in the year 1947. Domestic consumption of mercury has increased heavily in 1948, to 25,700 flasks by mid-year, as compared with 35,581 in 1947.

Nonferrous Metals Prices

	Dec. 22	Dec. 23	Dec. 24	Dec. 26	Dec. 27
Copper, electro, Connecticut	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Connecticut	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30

McKee Co. Dividend

Cleveland

• • • **Directors of** Arthur G. McKee & Co. have declared a dividend of $1.25 per share on Class B stock of the company which is payable on Dec. 23 to stockholders of record Dec. 17.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$92 to $94
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$89 to $93
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	21.00*	22.00
No. 120	20.50*	21.50
No. 123	20.00*	21.00
80-10-10 ingot		
No. 305		27.25
No. 315		24.25
88-10-2 ingot		
No. 210		33.00
No. 215		31.00
No. 245	24.75*	25.75
Yellow ingot		
No. 405	17.00*	17.50
Manganese bronze		
No. 421		23.00

* F.o.b. Philadelphia

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.25–31.75
0.60 copper, max.	30.75–31.25
Piston alloys (No. 122 type)	26.50–27.00
No. 12 alum. (No. 2 grade)	26.25–26.75
108 alloy	26.50–27.00
195 alloy	27.00–27.25
13 alloy	31.00–31.50
AXS-679	27.25–27.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	28.75–29.50
Grade 2—92 pct-95 pct	27.75–28.50
Grade 3—90 pct-92 pct	26.75–27.50
Grade 4—85 pct-90 pct	26.25–26.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40½
Electrodeposited	34⅜
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅜
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	
Cadmium	$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.03	
Copper, drawn		34.28	
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass		29.24	
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy, Olympic, etc.	40.49	40.76	41.82
Nickel silver 10 pct		47.17	44.77
Architectural bronze	33.42		

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21⅛	20⅜
Yellow brass	18⅞	18⅛
Red brass	20	19¼
Commercial bronze	20⅛	19⅜
Manganese bronze	18¾	17⅞
Leaded brass rod ends	18⅛	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.50–20.50
No. 2 copper wire	19.50–19.50
Light copper	18.50–18.50
Refinery brass	18.25–18.50

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.50–16.50
No. 1 comp. turnings	16.25–16.25
Rolled brass	12.75–13.25
Brass pipe	13.25–13.75
Radiators	14.00–14.50
Heavy yellow brass	12.50–12.75
Aluminum	
Mixed old cast	16.00
Mixed old clips	16.00
Mixed turnings, dry	14.50
Pots and pans	16.50
Low copper	19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18½—19
No. 2 heavy copper and wire	17½—18
Light copper	16½—17
Auto radiators (unsweated)	12 —12¼
No. 1 composition	14½—15
No. 1 composition turnings	14 —14½
Clean red car boxes	12 —12½
Cocks and faucets	12 —12½
Mixed heavy yellow brass	9 — 9½
Old rolled brass	11½—12
Brass pipe	13 —13½
New soft brass clippings	15 —15½
Brass rod ends	13 —13½
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	8 — 8½
Aluminum crankcases	12 —12½
2S aluminum clippings	16 —16½
Old sheet & utensils	12 —12½
Borings and turnings	6 — 6½
Misc. cast aluminum	12 —12½
Dural clips (24S)	12 —12½

Zinc

New zinc clippings	11 —11½
Old zinc	9½—10
Zinc routings	5¼— 5¾
Old die cast scrap	6¼— 6¾

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	22 —23
Nickel rod ends	21 —22
New Monel clippings	15½—16½
Clean Monel turnings	11 —12
Old sheet Monel	13 —14
Old Monel castings	10 —11
Inconel clippings	12 —13
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	7 — 7½

Lead

Soft scrap lead	18 —18½
Battery plates (dry)	12 —12½

Magnesium Alloys

Segregated solids	8 — 8
Castings	4½— 5½

Miscellaneous

Block tin	82 —84
No. 1 pewter	65 —67
No. 1 auto babbitt	51 —53
Mixed common babbitt	19 —19½
Solder joints	21½—22½
Siphon tops	50 —52
Small foundry type	20½—21
Monotype	19½—20
Lino. and stereotype	19 —19½
Electrotype	17½—18
New type shell cuttings	15½—16
Hand picked type shells	6½— 7
Lino. and stereo dross	10½—11
Electro dross	7 — 7½

SCRAP

. . . News and Market Activities

Some Mills Abandon Earmarking Obligation

New York

• • • **Only action in a** dull market during the holiday season took place in Chicago where Youngstown Sheet & Tube Co. and Inland Steel Co. have abandoned the practice of requiring their customers to ship back scrap under an earmarked basis. Sheet & Tube has told THE IRON AGE that it has 5 months supply of scrap on their grounds. Inland Steel is also well set and has shut off all shipments. This leaves the market shaky and uncertain over what future developments will result from the action of these two companies.

Carnegie-Illinois, another factor in the market in this area, is also reported to have a large inventory, somewhere in the neighborhood of 250,000 tons. Carnegie has not, however, indicated that it intends to cancel earmarking arrangements.

Right now scrap appears to be a drug on the market in Chicago. One of the props under the market has been conversion scrap. Even this has started to weaken. Reliable sources expect prices there to slip within the next few weeks.

The cast market continued weak and spotty this week with No. 1 machinery cast dropping $1 a ton in Pittsburgh and also at Detroit where machine shop turnings and mixed yard cast were also off.

In Birmingham, the only area where the cast grades have held firm during the past several weeks, No. 1 cupola cast dropped $3 a ton to go at $68 to $70.

The weeks following the holidays are daily establishing themselves as active ones in the scrap field. Sentiments are mixed as to what will result. Some feel that prices will hold. Others that they won't. Feelings are strong, however, that prices will not hold. How far they will drop, if they do, no one can venture to say. The answer appears to be in the offing soon.

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PITTSBURGH—Except for a $1 decline in No. 1 machinery cast iron scrap during the past week the market has been in its usual holiday doldrums. Mill inventories are still at unusually high levels. Some buyers are now out of the market for dealer steelmaking scrap. These companies are expected to pick up more material than they lay down during January. Purchasing agents, thinking (or hoping) that prices may dip before spring don't want to be caught with heavy high prices inventories. The only thing holding cast iron scrap at current levels in this district is outside pressure; local buying is standing still.

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CHICAGO—Right now Ripley could do a good piece on scrap. The market is extremely shaky. Scrap could fall X number of dollars any time. Youngstown Sheet and Tube on Dec. 15 released all customers from the obligation of earmarking arrangements in this area. Inland did the same thing early last week. Y. S. and T. Co. told IRON AGE they have 5 months' supply on the ground. Inland Steel will not buy a pound. Carnegie is reputed to have one-quarter of a million tons in inventory. Carnegie does not intend to cancel their earmarking arrangements at present. Railroads specialties are on the skids. Foundry buying is spotty. Strange as it may seem scrap is a drug on the market in Chicago. How far prices will slip is the question. One of the strongest props under the former high priced market was conversion. This prop has started to weaken.

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PHILADELPHIA—The cold and snow has taken its toll on scrap moevment in this area but mills are still comfortable and one heavy melting consumer has gone out of the market for the next few weeks. Another that had been out of the market for some time has reentered the market. Earmarking deals are still in progress but the pressure is off on long distance hauls. Low phos grades for the openhearth have been sold at $48. Electric furnace buyers are out of the market. Cast scrap is weaker with pipe foundries continuing out of the market. Turnings are moving steadily and the market is firm. Most factors are marking time till the end of the holiday season to see which way the market will turn.

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CLEVELAND—Scrap is in the holiday doldrums here. One of the major consumers in this area is out of the market for the time being, but will be back in during January on a more selective basis. In the present market, however, it will be difficult to get the quality of openhearth material up with low phos premiums as numerous as New Year's parties. Shipments are very good, which is just the reverse of last December, but probably means that January shipments will be down. Cast is weak. It was reported here this week that a dealer in another district attempted to pass off outside tonnage as customer scrap, with the result that the mill involved has ruled that from now on, no more customer will be taken out of dealers' yards.

DETROIT — Market sentiment here points downward but market prices are holding in the absence of any mill buying in this area. Shipments are excellent and are favored by the absence of snow in the yards. Most sources look for a period of comparative quiet in the Detroit market, at least until after the first of the year.

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CINCINNATI—Major consumers in this area are offering $46 for low phos and trying to drop openhearth grades $1.10. Dealers that are loaded up may be compelled to take orders at these prices in order to move material immediately. On the other hand, enough old orders are out at the formula to preclude a price break at this particular time. At the moment, the market is very sloppy. Industrial plants are down for the holidays and therefore scrap from this source is at a low ebb in movement. Cast is weaker with the foundries either closed or sitting tight until after the first of the year.

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NEW YORK—Cold weather and continuation of the holidays added to the dullness of the market this week. Everything was static. What will come with the New Year remains to be seen. Feelings are mixed. Some think that current prices will prevail for some time, others feel that a severe test period will be met while still others think that prices will fall off. That the first of the year will provide a test period of some sort is inevitable and everyone is girded for it.

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BUFFALO — The long stalemate in openhearth scrap was broken last week as dealers booked the first mill orders for any real tonnage since late August at the mills' price of $42.25 delivered. The action followed a sharp letdown in the conversion business that lifted steelmaking grades from $1 to $2 over the accepted market and barred short sales at $42.25. During the deadlock dealers continued their direct transactions with mills to spot shipments on open orders as scrap became available. Otherwise the local market showed no particular change, with the holidays restricting activity. Foundry scrap specialties displayed a continuing soft undertone, with slow demand rather than heavy offerings the chief influence.

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BOSTON—Activity picked up here, but there is no change in prices. The one price change noted was a slight drop in shoveling turnings, the price now being quoted at $31 to $33. Many of the other prices remain close to formula with No. 1 heavy melting steel still selling up to $38.90. There is no market for clean cast chemical borings for chemical purposes.

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BIRMINGHAM—Cast iron prices here remain on the soft side with quotations down another dollar. A high of $70 is being paid for No. 1 cupola cast compared to $73, 3 weeks ago. The market generally is in the seasonal doldrums with little material of any kind moving either to local consumers or Northern mills.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	58.00 to 59.00
Rails 2 ft and under	62.00 to 62.50
No. 1 comp'd bundles	42.50 to 43.00
Hand bdld. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.00 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	68.50 to 69.50
Mixed yard cast	64.00 to 65.00
Hvy. breakable cast	62.00 to 63.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	57.00 to 58.00
RR. coil springs	57.00 to 58.00
RR. leaf springs	57.00 to 58.00
Rolled steel wheels	57.00 to 58.00
Low phos.	49.50 to 50.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.50 to $42.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	39.50 to 40.00
Bundled mach. shop turn.	39.50 to 40.00
Galv. bundles	37.00 to 38.00
Mach. shop turn.	34.50 to 35.00
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Mix. borings and turn.	34.50 to 35.00
Low phos. hvy. forge	49.00 to 50.00
Low phos. plates	47.00 to 48.00
No. 1 RR. hvy. melt.	43.75 to 44.25
Rerolling rails	67.00 to 68.00
Miscellaneous rails	59.00 to 60.00
Angles & splice bars	55.00 to 56.00
Locomotive tires, cut	52.00 to 53.00
Cut bolster & side frames	51.00 to 52.00
Standard stl. car axles	84.00 to 86.00
No. 3 steel wheels	49.00 to 50.00
Couplers and knuckles	50.00 to 51.00
Rails, 2 ft and under	57.00 to 58.00
Malleable	82.00 to 83.00
No. 1 mach. cast	68.00 to 69.00
No. 1 agricul. cast	60.00 to 62.00
Heavy breakable cast	60.00 to 62.00
RR. grate bars	60.00 to 61.00
Cast iron brake shoes	59.00 to 60.00
Cast iron car wheels	64.00 to 65.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast	65.00 to 66.00
Hvy breakable cast	59.00 to 60.00
Rails 18 in. and under	61.00 to 63.00
Rails random length	56.00 to 57.00
Drop broken	69.00 to 70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.90
No. 2 hvy. melting	34.40 to 34.40
Nos. 1 and 2 bundles	34.40 to 34.40
Bushelings	34.40 to 34.40
Shoveling turn.	31.00 to 33.00
Machine shop turn.	29.40 to 31.00
Mixed bor. and turn.	29.40 to 31.00
Cl'n cast chem. bor.	nominal
No. 1 machinery cast	64.00 to 65.00
No. 2 machinery cast	57.00 to 59.00
Heavy breakable cast	52.50
Stove plate	54.50 to 55.50

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	$31.00 to 32.00
Machinery cast	60.00 to 62.00
Mixed yard cast	56.00 to 57.00
Shoveling turn.	31.50 to 32.00
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	31.50 to 32.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.00 to 45.00
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	37.00 to 38.00
Shoveling turn.	41.00 to 41.50
Mixed bor. and turn.	36.75 to 37.25
Clean cast chemical bor.	nominal
No. 1 machinery cast.	65.00 to 66.00
No. 1 mixed yard cast.	59.00 to 60.00
Hvy. breakable cast.	61.00 to 62.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. acid, openhearth	47.00 to 48.00
Low phos., electric furnace	50.00 to 51.00
Low phos. bundles	46.00 to 47.00
RR. steel wheels	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. malleable	80.00 to 82.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires, uncut	47.00 to 48.00
Mis. std. sec. rails	57.00 to 58.00
Steel angle bars	54.00 to 56.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	49.00 to 50.00
Steel car axles	73.00 to 75.00
Brake shoes	54.00 to 56.00
Malleable	75.00 to 77.00
Cast iron car wheels	64.00 to 65.00
No. 1 machinery cast	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 bunsheling	40.00
Long turnings	$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	45.00 to 46.00
Structural and plate	45.00 to 46.00
No. 1 cupola cast	68.00 to 70.00
Stove plate	65.00 to 67.00
No. 1 RR. hvy. melt.	41.00
Steel axles	65.00 to 68.00
Scrap rails	48.00 to 49.00
Rerolling rails	65.00 to 67.00
Angles & splice bars	53.00 to 54.00
Rails 3 ft & under	53.00 to 54.00
Cast iron carwheels	63.00 to 64.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bor. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast	59.00 to 60.00
Mixed yard cast	56.00 to 57.00
Heavy breakable cast.	55.50 to 56.50
Charging box cast.	55.50 to 56.50
Unstrp. motor blks.	53.50 to 54.50
Cl'n cast chem. bor.	nominal

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$47.00 to $49.00
No. 2 hvy. melting	41.75 to 42.25
No. 1 bundles	41.75 to 42.25
No. 2 bundles	41.75 to 42.25
No. 1 busheling	41.75 to 42.25
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	38.75 to 39.25
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast.	67.00 to 68.00
Mixed yard cast.	63.00 to 66.00
Stove plate	63.00 to 66.00
RR. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	58.00
Rails 3 ft & under	63.00 to 64.00
RR. steel wheels	56.00 to 58.00
RR. coil & leaf spgs.	56.00 to 58.00
RR. knuckles & coup.	56.00 to 58.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $42.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	72.00 to 74.00
Malleable	79.00 to 81.00
RR. cast.	75.50 to 77.00
Railroad grate bars	58.00 to 61.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast	40.00 to 50.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

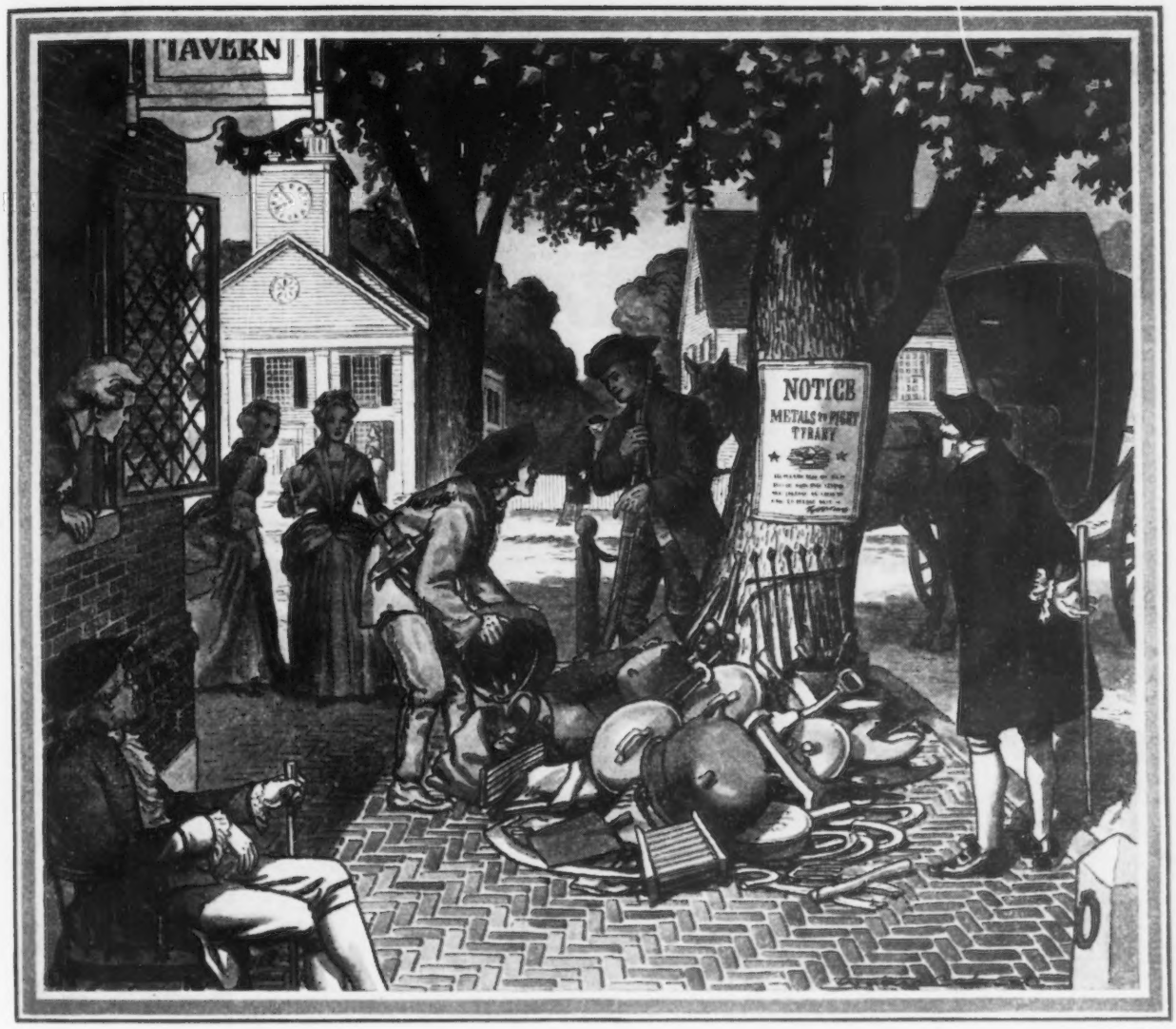
No. 1 & No. 2 hvy. melt.	$30.00 to $33.00
Elec. fur. 1 ft and under	40.00 to 42.00
No. 1 cupola cast	50.00 to 54.00
RR. hvy. melting	30.00 to 33.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$48.00 to 50.00*
No. 2 cast	44.00 to 46.00*

*Ceiling Price



FIRST AMERICAN SCRAP DRIVE

During the Revolutionary War, many local scrap drives were conducted. Loyal colonists gave their kettles and other iron ware for use in making guns and materials of war. Through every critical period in American history, scrap has always been in great demand. Today, 26,000,000 tons are needed annually to fill the requirements of industry.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Dec.28, 1948	Dec. 21, 1948	Nov. 30, 1948	Dec. 30, 1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15
Wire: (cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron: (per gross ton)	Dec.28, 1948	Dec. 21, 1948	Nov. 30, 1948	Dec. 30, 1947
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$42.98
No. 2, Valley furnace	46.50	46.50	46.50	37.50
No. 2, Southern Cin'ti	49.47	49.47	49.47	39.74
No. 2, Birmingham	43.38	43.38	43.38	34.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	38.00
Basic del'd Philadelphia	50.76	50.76	50.76	42.48
Basic, Valley furnace	46.00	46.00	46.00	37.00
Malleable, Chicago†	46.50	46.50	46.50	38.50
Malleable, Valley	46.50	46.50	46.50	37.50
Charcoal, Chicago	73.78	73.78	73.78	56.04
Ferromanganese‡	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.

Scrap (per gross ton)	Dec.28, 1948	Dec. 21, 1948	Nov. 30, 1948	Dec. 30, 1947
Heavy melt'g steel, P'gh.	$42.75	$42.75	$42.75	$40.00
Heavy melt'g steel, Phila.	44.50	44.50	44.50	40.50
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	39.50
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	35.00
Low phos. Young'n	47.75	47.75	47.75	47.25
No. 1, cast, Pittsburgh	*69.00*	70.00	70.00	54.50
No. 1, cast, Philadelphia	65.50	65.50	66.50	55.50
No. 1, cast, Chicago	68.50	68.50	72.50	63.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.00	$15.00	$15.00	$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	94.00
Zinc, East St. Louis	17.50	17.50	17.50	10.50
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944: for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Dec. 28, 1948	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One week ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One year ago	3.19541¢ per lb.	$37.98 per gross ton	$40.00 per gross ton

	HIGH	LOW
1948	3.75700¢ July 27	3.22566¢ Jan. 1
1947	3.19541¢ Oct. 7	2.87118¢ Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.54490¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1948	$46.82 Oct. 12	$39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov 5	17.83 May 14
1934	17.90 May 1	16.90 Jan. 27
1933	16.90 Dec. 5	13.56 Jan. 3
1932	14.81 Jan. 5	13.56 Dec. 6
1931	15.90 Jan. 6	14.79 Dec. 15
1930	18.21 Jan. 7	15.90 Dec. 16
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1948	$43.16 July 27	$39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1934	13.00 Mar. 13	9.50 Sept. 25
1933	12.25 Aug. 8	6.75 Jan. 3
1932	8.50 Jan. 12	6.43 July 5
1931	11.33 Jan. 6	8.50 Dec. 29
1930	15.00 Feb. 18	11.25 Dec. 9
1929	17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25–3.30	3.25	3.25	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[15]	5.85
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren =4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$6.80	$6.80	$6.80		$6.90			$6.90	$7.00	Warren, Ohio =$6.80				Pittsburg, Cal. =$7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	4.75	4.75	4.75					4.85							
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	3.45	3.40	3.45 Coatesville =3.75, Claymont =3.95 Geneva =3.40, Harrisburg =6.50				3.65	3.45	4.30[16]	5.80
Floor plates	4.55	4.55		4.55	Cons hohocken =3.95			Cons hohocken =4.55							
Alloy	4.40	4.40							Coatesville =5.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil harden manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
CF&I and Inland, $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Alumnized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-colov	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.40	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	5.15	5.25
Cold-rolled	6.05	6.05	6.05		6.05	6.05	6.05	6.25	6.35
Galvanized		6.75				6.75			
Strip									
Hot-rolled	4.95	4.95	4.95		4.95	4.95	4.95	5.15	5.25
Cold-rolled			6.05			6.05	6.05		6.35
Shapes		4.95			4.95	5.05	4.95		
Beams		4.95							
Bars									
Hot-rolled	5.10	5.10	5.10		5.10	5.10	5.10		5.40
Bar shapes		5.10			5.10	5.10	5.10		

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
½-in.	43 to 41	20 to 18
¾-in.	46 to 44	24 to 22
1-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3 in.	39½	21½
3½ to 6 in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in.	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
½-in.	+20½	+52½
¾-in.	+10½	+41½
1 & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	20½ to 18½
¾-in.	46 to 44	24½ to 22½
1-in.	48 to 46	27½ to 25½
1¼-in.	48½ to 46½	28 to 26
1½-in.	49 to 47	28½ to 26½
2-in.	49½ to 47½	29 to 27
2½ to 3-in.	50 to 48	29½ to 27½
Steel, lapweld		
2-in.	39½	18½
2½ to 3-in.	44½	23½
3½ to 6-in.	48 to 44	23 to 27
Steel, seamless		
2-in.	37½ to 32½	16½ to 11½
2½ to 3-in.	41½ to 36½	20½ to 15½
3½ to 6-in.	45	24
Wrought Iron, buttweld		
½-in.	+16	+46½
¾-in.	+ 9½	+39½
1 to 2-in.	— 1½	+28½
Wrought Iron, lapweld		
2-in.	+ 4½	+33
2½ to 4-in.	— 5	+21½
4½ to 6-in.	— 1	+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $106.70
6 to 24-in., del'd N. Y. ..... 103.50 to 108.40
6 to 24-in., Birmingham 93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 120.30

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quentities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.05
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, Bessemer	$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	30.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.55
Chromium, electrolytic, 99% min.	$3.50
Lead	27.80¢
Manganese	55.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct	
Buffalo	$22.75 to $23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	
Std. ¾-in. grains	
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.52	$5.35-5.66	$6.51	$5.37-5.52	$5.09-5.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	7.15-7.30	4.85-5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02-5.07	5.92	7.12-7.47	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57	10.67-10.72
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85	5.75	7.65	5.56	6.35	5.35	5.10	5.05	5.90	9.70	9.95	11.15	11.40
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[8]	5.82-6.21[8]	6.97-7.65	5.25-5.62[8]	6.31	5.50-5.71[8]	5.30-5.47[8]	5.30-5.62[8]	6.06-6.17[8]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.64	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.41	6.31	7.30-7.71	5.41	....	5.66	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92		9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[1]	6.36	6.45	5.05[11]	6.36	5.25[11]	5.00[11]	5.00[11]	6.66	....	....	....	....
Houston	6.40		8.80	6.75		6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.90	6.60-6.66	9.35[5]	6.10-7.40	5.75-5.90	6.05	7.85[15]-8.45	10.90	10.85	12.40	12.65
San Francisco	5.95[8]	7.15[2]	8.25-8.90	6.75[8]	8.25	6.30-7.60	5.90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2]-8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65-8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.59	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos
Bethlehem	48.00					Boston	Everett	$0.50 Arb.		49.50	50.00		
Birmingham	42.88	43.38				Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Buffalo	47.00-48.00*	47.00-48.00*	47.50-48.50*			Brooklyn	Bethlehem	3.90	51.90				
Chicago	46.00	46.50	46.50	47.00		Cincinnati	Birmingham	6.09	48.97	49.47			
Cleveland	46.00	46.50	46.50	47.00	51.00	Jersey City	Bethlehem	2.39	50.39				
Duluth	46.00	46.50	46.50	47.00		Los Angeles	Provo	6.93	52.93	53.43			
Erie	46.00	46.50	46.50	47.00		Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Everett		49.50	50.00			Philadelphia	Bethlehem	2.21	50.21				
Granite City	47.90	48.40	48.90			Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	
Ironton, Utah	62.00	62.50				Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
Lone Star, Texas		75.00†				San Francisco	Provo	6.93	52.93	53.43			
Neville Island	46.00	46.50	46.50			Seattle	Provo	6.93	52.93	53.43			
Provo	46.00	46.50				St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65		
Sharpsville	46.00	46.50	46.50	47.00									
Steelton	48.00	48.50	49.00	49.50	54.00								
Struthers, Ohio	46.00												
Swedeland	50.00	50.50	51.00	51.50									
Toledo	46.00	46.50	46.50	47.00									
Troy, N. Y.					54.00								
Youngstown	46.00	46.50	46.50										

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo $60.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$160
F.o.b. Johnstown, Pa.	$162
F.o.b. Sheridan, Pa.	$160
F.o.b. Rockwood, Tenn.	$165
F.o.b. Etna, Pa.	$163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Cl	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	5.90
Ton lots	7.50
Less ton lots	8.40

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.50
50% Si	10.50
75% Si	13.00
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carload	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C.	1.09
0.50% max. C.	1.05
9.00% min. C.	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.75
Less ton lots	2.80
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.40
Less ton lots	1.45
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	$.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25